

ANNUAL REPORT 1985-86



REPORT OF THE DEPARTMENT OF AGRICULTURE

for the year ended 30 June 1986

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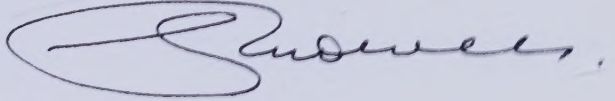
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Photographs: John Gasparotto

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The Hon. J.R. HALLAM
Minister for Agriculture
and Fisheries
Sydney

Sir,

I have the honour to present a report
reviewing the activities of the
Department of Agriculture for the
year ended 30 June 1986.

A handwritten signature in dark ink, appearing to read 'G.H. Knowles', with a large, stylized initial 'G'.

G.H. KNOWLES
Director-General

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FOREWORD

by the Director-General for Agriculture Mr G.H. Knowles

RURAL ECONOMY

Farm incomes fall

A significant portion of the State's primary producers faced severe financial pressures during the year.

At the national level, the rural sector's real net income in 1985-86 fell by 32% over that of the previous year, to the second lowest level since records began in 1950-51. At the farm level, the Bureau of Agricultural Economics has estimated that one-quarter of their surveyed farmers will have negative farm incomes in 1985-86.

This adverse economic situation has arisen only three years after farm incomes fell to their lowest levels on record as a result of the 1982-83 drought. Many farmers have not yet recovered from losses suffered during the drought and are consequently unusually vulnerable to an economic downturn.

Causes of decline

The rural sector has faced a long-term decline in its terms of trade, with the increases in costs exceeding price increases. However, the current sharp fall in incomes is due more to a drop in farm returns than to an increase in costs, as real farm costs have stabilised in recent years.

As Australia exports, on average, 70% of its agricultural production, farm returns are subject to the vagaries of the international marketplace. Since 1980 there has been a significant slowing in world import demand for agricultural products, in particular from the developing and centrally planned economies. World trade has also been slowed since 1980 by increasing international protectionism.

This protectionism, particularly in the European Community under the Common Agricultural Policy, has led to continuing increases in production, despite the cessation of growth in demand. Stocks have grown dramatically, and the major stockholding nations have increasingly resorted to export subsidies to help them clear their excessive stocks. This already serious situation has been further compounded by the 1985 United States Farm Act, whereby the US Government has now made a conscious decision to regain its market share and to reduce its stockholding costs.

DEPARTMENT'S RESPONSE

Priority program

Both the Commonwealth and State Governments announced policies aimed at providing immediate assistance to the rural sector, and ensuring its longer term viability.

The Department of Agriculture's on-going activities in improving the productivity and efficiency of the rural sector through its research, advisory and education services all contribute to assisting the rural sector. Given the severe economic pressures facing the rural sector, however, the Department instituted the Farm Resource Management Program as its highest priority strategic plan.

The aim of the program is to assist farmers to adjust to economic pressures, and the program's objectives are:

- to provide economic information for use in farming decisions
- to highlight the significance of adjustment pressures on agriculture and to enhance the Department's capacity to develop policies and programs that reflect these pressures and the options available
- to promote key decision-making and managerial skills relevant to farm businesses.

The Department has, of course, previously encompassed these objectives within its overall program, but the intention of the Farm Resource Management Program is to focus the Department's resources upon their

execution, and to ensure that the results are widely distributed amongst farmers.

An example of this approach has been the Farm Finance Seminars initiated by the Livestock and Grain Producers' Association, in which the Department participated and provided a large part of the information that was distributed.

Export development

Another departmental response to the steadily worsening terms of trade faced by producers has been developed over several years. It has been clear for some time that the State's agriculture needed to diversify and to reduce its dependence on the export of half-dozen major agricultural commodities to a shrinking world market. It was equally clear that as well as diversifying agricultural production, NSW desperately needed to develop new export markets.

To put meaning into export development, the Department employed a consultant, Mr Westbrook Haines, in 1984. Mr Haines heads up a small Export Development Unit that includes Mr Nobby Sugimoto, a Japanese national with wide international commodity-trading experience.

At the same time that new markets were being explored, the Department increased emphasis on assisting those industries for which profitable export markets exist and on assisting in the establishment of new industries with export potential.

The Minister for Agriculture and Fisheries established the NSW Horticulture Export Development Council. The Council consists of key producers and exporters and is serviced by the Department's Export Development Unit. The Council has forecast that horticultural exports from NSW could reach \$100 million by 1990, a four-fold increase over the 1982-83 figure, with scope for even greater development beyond 1990. Other export development initiatives for which the Department has either been solely responsible or in which it was instrumental are:

- developing export markets for oranges in Japan and Europe, onions in Europe and Murray Grey beef cattle in Japan
- establishing industry market planning groups in the macadamia, citrus, avocado and blueberry industries

- arranging visits by key importers from North America, Japan and Europe to horticultural production areas in NSW
- initiating a review of the fishing and goat industries to determine their export direction.

CORPORATE PLANNING

The initiatives on resource allocation, diversification and on export development have all arisen from the Department's corporate planning process. An interim plan was produced in 1982. It was refined through a process of consensus within the Department and rewritten as the Corporate Plan early in 1985. This year, the Corporate Plan is supplemented by a Strategic Plan that aims at increasing the emphasis devoted to priority programs. As well as farm resource management and support development, programs on pesticides, animal welfare, land and environment protection, wool production and fisheries management are included.

The whole planning process will be rounded off by the introduction of computer-based program budgeting, the enhancement of the Department's Management Information System and by a new system of reporting.

This report is the first in the new format. The report relates directly to the programs shown in the Department's budget and highlights those programs appearing in the Strategic Plan.

CHARTER

The Department of Agriculture was initially an off-shoot from the Department of Mines. The creation of the Department of Agriculture was, then, an administrative rather than a legislative decision. The fisheries of NSW were placed under Ministerial control as 'Chief Secretary's Department—Fisheries Branch' in 1911. A separate administrative unit, New South Wales State Fisheries, was formed in 1976 and was integrated with the Department of Agriculture in 1983. The Fisheries and Oyster Farms Act, 1935, sets out the powers and functions of the Minister in relation to fisheries generally.

The Department's charter has changed little over time and its present corporate



Nobuhiko Sugimoto, Export Development Officer, (far left) and Westbrook Haines, Executive Director (Export Development), (far right) of the Export Development Unit with Kenosuke Murasaka, Director of Citrus Committee, Nisseikyo, and Mikiji Nimura, President, Nisseikyo, members of a visiting Japanese delegation. The Unit is responsible for developing export initiatives, to help NSW producers diversify agricultural production and find new export markets.

goals are compatible with the statement of 1 July 1890 by the Hon. Sidney Smith, the first Minister for Mines and Agriculture, which appeared in the first issue of the *Agricultural Gazette*.

CORPORATE GOALS

The goals of the Department of Agriculture are to improve the prosperity and quality of life of both the rural and urban communities of New South Wales by:

1. Promoting the efficient sustainable use of the agricultural, livestock and fisheries resources.
2. Protecting and enhancing the environment.
3. Safeguarding and improving the productivity and profitability of our agricultural, livestock and fishing industries.
4. Encouraging diversification and development of new enterprises within those industries.
5. Developing and maintaining effective liaison with each industry.
6. Fostering the development and management of recreational fishing.
7. Encouraging the marketing of safe, acceptable produce.
8. Assisting in seeking, identifying and developing markets.
9. Ensuring efficient cost-effective use of revenue in attaining these goals.

AIMS AND OBJECTIVES

Arising from the corporate goals are the following objectives:

GENERAL OBJECTIVES

Staffing

1. To maintain an encouraging and concerned attitude towards the welfare of employees, and to encourage their personal development.

Department's clients

2. To provide services to the total community with emphasis on efficient producers to maximise the benefits to New South Wales.

Competing services

3. To provide services that will not compete when satisfactory alternative services are available or can be encouraged to develop.

Style of action

4. To anticipate and seek solutions to production, management and marketing problems.
5. To maintain a modern information system to communicate with the public.

REGIONAL OBJECTIVE

6. To deliver to rural industries, programs and services appropriate to local conditions and needs, and consistent with departmental objectives.

DIVISIONAL OBJECTIVE

7. To design and evaluate programs and services for rural industries and to provide support to regions in the application of programs consistent with departmental objectives.

SERVICES OBJECTIVES

Marketing

8. To improve the matching of producer decisions with market demands.
9. To provide information on the analysis and availability of markets for primary produce.
10. To monitor the economic situation in key rural industries and advise government and industry of trends, and to provide information to encourage the efficient allocation of resources.

Agricultural education

11. To help ensure that there is an appropriate level of skills and knowledge training in agriculture.
12. To improve consumer education about agricultural commodities.



The Minister, Jack Hallam, the then Premier, Neville Wran, the Regional Director of Agriculture for the Murray and Riverina, Dennis Toohey, and the Director-General, George Knowles, at the official opening of the Short Course Centre at the Murrumbidgee College of Agriculture, Yanco. The Centre runs short course programs relevant to current technical and management problems in the rural community



A segment of Simon Townsend's 'Wonder World' being filmed with Kate Tye, former Home Economist of the Primary Products Promotion Unit. The Unit actively promotes agricultural and fisheries produce to the general public using all media.

Disaster management

13. To assist producers affected by disasters, and who can be viable in the long term, to remain in production.
14. To encourage efficient resource management during disasters, thereby reducing land degradation and the depletion of essential breeding stock.
15. To encourage self-help by producers to achieve natural disaster preparedness.

Regulation

16. To maintain and develop a prudent set of regulations to promote the long-term efficiency, safety and harmony of the agricultural, livestock and fishing industries.
17. To ensure that relevant government regulations are understood by the community.

INDUSTRY OBJECTIVES

Improvement

18. To assist in relating genotypes and breeding systems to the various New South Wales production and marketing environments.
19. To encourage development of genotypes capable of increased productivity and profitability.
20. To foster the sale and export of demonstrably superior genetic material.
21. To ensure the availability of a diversity of improved and appropriate genetic material.

Protection—pests and diseases

22. To ensure that the means are available to protect plant, livestock and fish industries from pests and diseases.
23. To improve and operate an agricultural and fisheries quarantine and export inspection service.
24. To conduct programs in plant and animal health to minimise the economic effects of diseases and to improve productivity and market quality of animals, plants and fish, and their products.

Animal welfare

25. To protect and enhance the welfare of economic livestock and to protect animals against harmful husbandry and experimental procedures.

Public health

26. To conduct programs to minimise the spread of diseases from animals to the human population.

Environment

27. To provide advice on the use of land to ensure the maintenance of a high quality environment.
28. To protect the environment by encouraging efficient adoption of approved practices in the use of all agricultural and fisheries resources, including recreational fishing.

Production

29. To improve rural productivity by identifying and helping to overcome production constraints.
30. To provide advice on all technical and economic aspects of agricultural, livestock and fisheries production, to enable the most efficient use of resources.

Products

31. To encourage improvement in product quality and in the harvesting, storage and distribution of agriculture and fishery products.

CORPORATE PLANNING

As well as performing a host of on-going activities, the Department is giving increased emphasis to 11 programs that are described in detail in its publication *Strategic planning in the Department of Agriculture* 1986.

The program titles and objectives are listed below. Progress towards achieving the objectives is included under each of the five major sections of the report.

1. Farm resource management

- To provide economic information for use in farming decisions.

- To highlight the significance of adjustment pressures on agriculture and to enhance the Department's capacity to develop policies and programs that reflect these pressures and the options available.
- To promote key decision-making and managerial skills relevant to farm businesses.

2. Pesticide program

- To facilitate an improvement in the use of pesticides and conduct research into new pesticides and their alternatives.

3. Computerised information systems

- To provide computer-based mechanisms for harvesting, storing and processing selected essential technical and regulatory data, and retrieving relevant information.
- To coordinate the development of these systems to ensure approved priorities are observed and that adequate interaction occurs, and to minimise wastage and overlaps between systems.

4. Conservation farming

- To develop and promote techniques that are economically sound and ecologically safe for use in sustainable productive systems.

5. Export development

- To increase rural exports from New South Wales.
- To identify export market opportunities.
- To facilitate export market opportunities.
- To assist producers to meet export market demands.

6. Animal welfare

- To promote the application of animal welfare codes of practice by the livestock industries.
- To ensure conformity to 'animals in research' legislation on all departmental institutions.
- To relate good animal welfare to good livestock production.
- To establish relationships between stress and productivity using stress indicators.

7. Herd health programs

- To increase the efficiency of animal production by reducing disease problems.
- To institute advisory programs promoting disease prevention by management, vaccination and other prophylactic measures.

- To develop or adopt herd health computer programs for use by officers and practitioners.
- To promote enrolment in these management schemes.

8. Land and environment protection

- To protect the agricultural and fishing resources of New South Wales and improve the rural environment.

9. Profitable wool production

- To develop and promote an integrated whole-farm approach to improve the profitability of wool production in New South Wales.

10. Coastal and estuarine fisheries management

- To protect fish stocks by limiting development of commercial fishing.

11. Staff development and training

- To provide appropriate development and training opportunities for staff in regard to departmental procedures, safety, communication skills and technical and scientific expertise.
- To offer direct assistance and counselling to staff at induction, during career development and in both personal and work-related situations of stress.
- To protect the entitlements of staff in regard to the Public Service Act, Anti-discrimination Act and other relevant legislation.

ACCESS

The Department's principal place of business is the McKell Building, Rawson Place, Sydney, telephone 217 6666.

The Department of Agriculture's administration is regionalised and the accompanying map on page 9 shows the boundaries of the five agricultural regions. Each region is managed by a Regional Director of Agriculture and they are located at:

Region 1: North Coast Region

North Coast Agricultural Institute
Wollongbar, NSW 2480
Telephone (066) 24 0200

THE AGRICULTURAL REGIONS OF NEW SOUTH WALES



Region 1: NORTH COAST
Headquarters Wollongbar

Region 2: NEW ENGLAND HUNTER AND METROPOLITAN
Headquarters Gunnedah

Region 3: ORANA AND FAR WEST
Headquarters Dubbo

Region 4: CENTRAL WEST, SOUTH EAST AND ILLAWARRA
Headquarters Orange

Region 5: MURRAY AND RIVERINA
Headquarters Yanco

Region 2: New England, Hunter and Metropolitan Region

New South Wales Government Offices
35-37 Abbott Street
Gunnedah, NSW 2380
Telephone (067) 42 9200

Region 3: Orana and Far Western Region

New South Wales Government Offices
37 Carrington Avenue
Dubbo, NSW 2830
Telephone (068) 81 1222

Region 4: Central West, South East and Illawarra Region

New South Wales Government Offices
181-187 Anson Street
Orange, NSW 2800
Telephone (063) 62 5122

Region 5: Murray and Riverina Region

Yanco Agricultural Institute
Yanco, NSW 2703
Telephone (069) 53 0211.

Within the Regions, and including metropolitan establishments that are outside of the regional system, the Department has 146 public offices of one kind or another in 127 separate areas. The difference between the two numbers is explained by the presence of more than one departmental office in some locations. For example, in Tamworth there is both the town office and a Research Institute about 11 km from the centre of the city.

HOURS OF BUSINESS

Normal hours of business are 8.30 am to 4.30 pm, Monday to Friday.

MANAGEMENT AND STRUCTURE

GENERAL

Basically, the Department's structure comprises an executive group, production and service divisions, and regions.

The Executive

The Executive is responsible for the overall management of the Department, and for ensuring that government agricultural policy is efficiently implemented.

The line of command is from the Minister through the Director-General, the Deputy

Director-General and five Executive Directors. The Executive constitutes a Board of Management, responsible for determining policy. See the organisation chart on page 11.

The Divisions

The divisions may be divided into 'production' and 'service' divisions, each headed by a Chief. The production divisions are concerned with agricultural or fisheries technology and the provision of specialised technical services to the producer. They are the Divisions of Animal Health, Animal Production, Fisheries, and Plant Industries. The service divisions provide a supportive role to the Department's activities and include the Divisions of Marketing and Economic Services, Agricultural Services, Administration, and the Biological and Chemical Research Institute.

The Regions

The boundaries of the five agricultural regions are shown on the map. Each region is under the control of a Regional Director of Agriculture, a position of equal status to a Chief of Division.

PRINCIPAL OFFICERS

At 30 June 1986 the Department's principal officers were:

Minister for Agriculture and Fisheries
J.R. Hallam, MLC

Director-General
G.H. Knowles, BSc

Deputy Director-General
G.R. Gregory, BScAgr, RDOen

Executive Director (Administration)
P.J. Small, Personnel Admin Cert

Executive Director (Fisheries)
D.D. Francois, BSc, MSc, PhD

Executive Director (Policy and Services)
J.E. Jessup, BScAgr

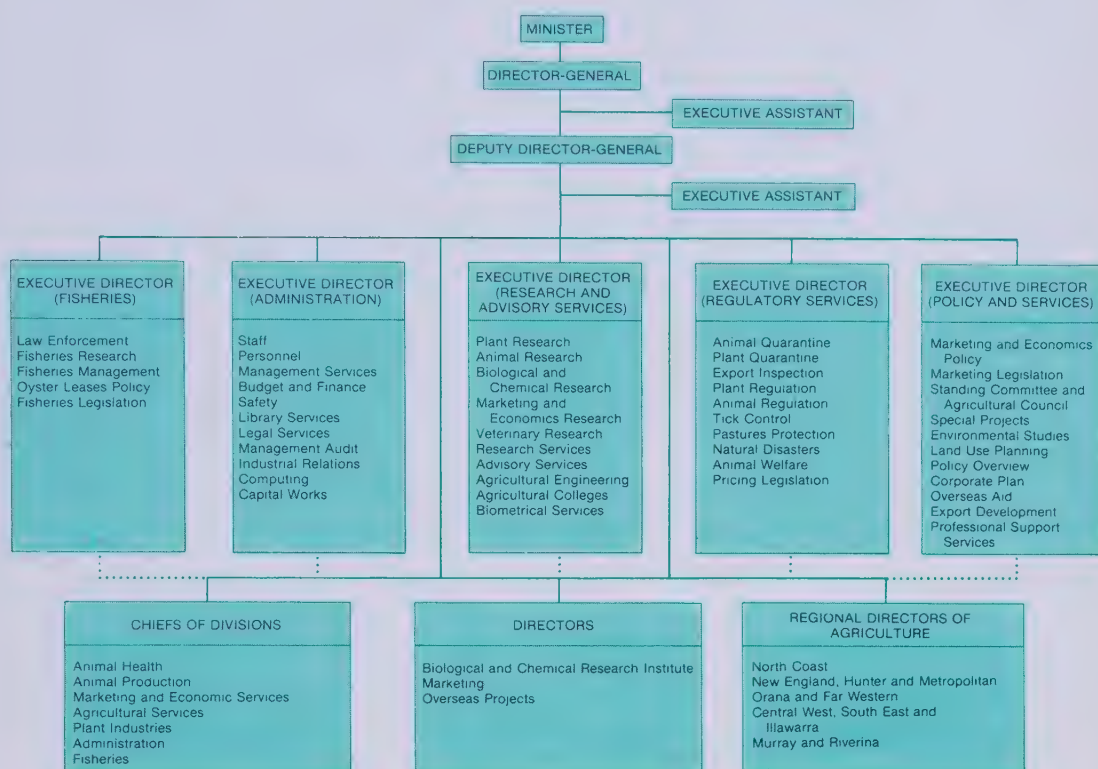
Executive Director (Regulatory Services)
B.D. Buffier, BRurSc(Hons), MEcon

Executive Director (Research and Advisory Services)
S.G. Grimmer, BScAgr, MSc, PhD

Executive Assistant to the Director-General
R.J. Jessup, BScAgr

ORGANISATION STRUCTURE

DEPARTMENT OF AGRICULTURE NEW SOUTH WALES



June 1986

Executive Assistant to the Deputy Director-General

F.S. Benecke, WDA, HDRE

Chief, Division of Agricultural Services
P.A. Witschi, BScAgr

Chief, Division of Animal Health
D.A. Dickinson, BVSc, MACVSc

Chief, Division of Animal Production
G.C. File, HDA(Hons), BRurSc(Hons), MRurSc

Chief, Division of Fisheries
P.A. Ayres, MIBiol, PhD, MRSH, FRIPHH

Chief, Division of Marketing and Economic Services
C. Gellatly, BAgEcon, MComm, PhD

Chief, Division of Plant Industries
R.A. Claxton, BSc(Agr)

Chief Administrative Officer
C.J. Cashman, MBA, BComm, BBus

Director of the Biological and Chemical Research Institute

M. Casimir, BScAgr(1st Class Hons)

Director of Marketing
R. D. Wise, MA

Regional Director of Agriculture, Region 1
B.D. Scarsbrick, BA(Sc), 4th yr
AgrSc(Massey, NZ), HDA

Regional Director of Agriculture, Region 2
E.J. Corbin, BScAgr

Regional Director of Agriculture, Region 3
O.R. Southwood, BScAgr

Regional Director of Agriculture, Region 4
D.J. McDonald, MScAgr, PhD(Texas A&M)

Regional Director of Agriculture, Region 5
D.E. Toohey, HDA, Grad Dip Extension

PLANT INDUSTRIES

Horticulture

Field crops and pastures

Plant quarantine and export services

CITRUS

Record production of 296 094 tonnes was 16% above 1984–85 due mainly to increased bearing areas of Valencia oranges. The previous strong demand and high prices for these processing oranges declined significantly during the season due to a substantial reduction in world prices of frozen orange juice concentrate. This trend, together with competition from fresh citrus imports in the summer–autumn period, resulted in some marketing problems with fresh late Valencia and grapefruit. The demand for main-crop processing lemons was also below normal with a surplus, particularly in inland districts.

New South Wales has not been a major exporter, but increased quantities were exported including Sunraysia oranges to Japan. Exports to existing and new markets are expected to increase.

Plantings continued to decline on the coast, but remained stable in most inland districts except for plantings in the Murrumbidgee Irrigation Area, where citrus plantings increased by a further 638 ha and now include 1540 ha (31%) of non-bearing Valencia oranges.

Crop improvement

The horticultural assessment and virus indexing of citrus varieties, clones or sports, together with screening of new rootstocks, continued.

Three Valencia evaluation projects for 25 clones were established. Navel, mid-season oranges and mandarin clones are being collected and imported for evaluation.

This research ensures that the best propagation material is selected, multiplied and supplied to industry through the Department's budwood and rootstock seed multiplication schemes. The Department supplied 534 500 buds and 465 kg of seed throughout Australia.

Protection services

With increased fresh fruit marketing and exports, improved routine pest and disease control programs will be necessary to ensure fruit of good quality and appearance.

Pest and disease problems remained at generally low levels, although there was some

reduced fruit quality; for example, black thrips (Gosford), melanose (Windsor), scales and light brown apple moth (*Tortrix*) (inland).

The integrated control program for the major pest red scale continues to be successful. New introductions of beneficial insects for biological control are planned for red scale, Chinese wax scale, black thrips and leaf miner.

A research program was started to improve the reliability of new virus detection technology by the biochemical molecular hybridisation technique, using a cDNA probe specific to the virus disease exocortis. This will ensure a faster and more accurate detection of the virus when regular surveys are required (for example, bud multiplication plantings) to ensure freedom from this disease.

Production services

Growers continued to adopt improved technology and efficiencies in production and resource use. Increased production and reduced costs must now be achieved for the two main markets—fresh and processing.

Current and successful advisory programs in culture and management include nutrition (zinc deficiencies, low pH, balance between nitrogen and phosphorus), irrigation, under-tree systems, scheduling and soil management (sod culture, herbicides).

Postharvest services

These services are closely related with the need to increase the proportion of fruit marketed fresh and exports by ensuring good fruit quality and appearance, and meeting plant quarantine requirements. New areas of research have been developed (for example, cold sterilisation and irradiation) as alternative disinfestation treatments for fruit fly.

Testing for fungicide resistance in individual packing sheds, screening of new fungicides and shrinkwrap storage research have become increasingly important for fresh marketing.

ORNAMENTAL CROPS

The value of nursery produce sales in NSW increased from \$17 million in 1974 to \$77 million in 1984.

There are now about 3400 nursery operators and about 3300 resellers registered. This year more than \$64,000 from the Horticultural Stock and Nurseries (HSN) Act Fund was distributed for approved research projects.

The Department received about 100 serious inquiries about cutflower growing from both established farmers and potential growers.

There is overproduction of easy-to-grow plants and established growers are tending to produce lines that require skills not possessed by newcomers.

Crop improvement

At the Horticultural Research and Advisory Station, Gosford, the Department has been working on research and development of Geraldton wax (*Chamelaucium uncinatum*) and *Crowea* species for several years. A number of very promising clones and production techniques are being developed.

The Department studied many Australian rainforest species and has selected a small group suitable for further development as indoor plants. Indoor plants and ferns make up almost 25% of the total value of sales of nursery produce in NSW.

Protection services

A research project at Gosford has established the usefulness of a number of herbicides for cutflower crops and potted plants. Recommendations have been widely adopted by the industry.

Another project developed a pesticide program for the control of the mealybug, *Pseudococcus longispinus*.

Evaluations of acaricides and studies of predator mites at Gosford have resulted in more efficient control of twospotted mite in ornamentals, including cymbidium orchids, carnations and roses.

Two hundred growers attended five 1-day and two 1-2-day workshops on pests and diseases conducted by advisory officers at the Biological and Chemical Research Institute, Rydalmere, and on the mid North Coast.

Services to cutflower growers and nursery operators have been improved since diagnostic procedures at Rydalmere were reorganised

Production services

Research on new ingredients for potting mixes aims to help nursery operators to change the ingredients and their proportions in response to availability and price, while still promoting plant growth and increasing shelf life.

Research on the symptoms of nutrient deficiencies in a range of important ornamentals has provided a basis for improved fertiliser recommendations.

The high proportion of inexperienced growers continued to put great pressure on advisory services.

The one district horticulturist specialising in ornamentals gave on-farm advice to about 250 nursery operators and cutflower growers in the greater Sydney region, and provided weekly advisory services to flower growers at the Sydney Farm Produce Markets.

Postharvest services

Studies at Gosford on the influence of potting mixes, temperature and light on potted plants ready for sale enabled nursery operators and retailers to extend shelf life.

Postharvest treatments commonly used on cutflowers overseas have been successfully introduced to the more progressive growers and quality and longevity of flowers after picking are improving.

GARDEN ADVISORY SERVICE

The Garden Advisory Service answered 23 800 inquiries: 19 700 telephone, 3500 personal and 600 mail.

Officers made nine television appearances on Channel 7's Romper Room and conducted two 10-week courses on home gardening through the Workers Educational Association (WEA) for 42 people.

The Service was represented on a panel of experts giving advice to the public during the Royal Botanic Gardens annual 'Spring in the Gardens' function.

More than 500 inquiries were dealt with at the Sydney Garden Fair held in conjunction with the NSW Agricultural Quarantine Service.

POME FRUITS

Recent planting statistics (31.12.85) show that bearing apple trees increased by 53 000 from the previous year to 1 367 000; 22% of trees are non-bearing. The trend towards higher densities is increasing in younger plantings. Substantial removals of Jonathan and Granny Smith trees between 1979–80 and 1984–85 have resulted in decreased production of these varieties. However, there have been large plantings of Delicious and this will balance decreases in production of the other varieties. Average annual apple production is expected to remain stable until 1990 at about 85 000 tonnes.

Estimated on-tree production for 1985–86 was 92 300 tonnes, but because of severe hail damage at Orange the harvested crop was reduced to about 82 700 tonnes. Severe hail damage also occurred at Bilpin and Oakdale with lesser damage at Bathurst and Batlow.

The traditional (European) pear industry remained static. Some increase in Packhams Triumph was offset by removals of Williams.

Removal of Williams is expected to continue. The total number of non-bearing trees of traditional pears needed to replace earlier removals is far below that required for maintenance. This makes the long-term future of the industry poor.

Estimated on-tree production of traditional pears in 1985–86 was 11 500 tonnes, but because of hail damage the harvested crop was reduced to about 10 200 tonnes.

Crop improvement

Preliminary results at the Agricultural Research and Veterinary Centre, Orange, comparing growth and productivity of apple trees infected by latent virus diseases with virus-indexed trees are available. These show higher yields for the first two harvests of virus-indexed Jonathan and Delicious. Granny Smith (one year only) also showed higher yields from indexed trees. These increases are shown in the following table:

Increase in yields and butt circumference of indexed varieties over two years

	Jonathan	Delicious	Granny Smith
Yield increase (%)	50	82	55
Butt circumference increase (%)	1.7	19.5	15

If early yield advantages of virus-indexed material are confirmed, production efficiency can be improved for very little extra cost to growers.

The Department's Pome Fruits Improvement Scheme provides both virus-indexed and non-indexed propagation material of all important and new commercial varieties.

Production services

Departmental research on fruit maturity to improve the market quality of Jonathan and Delicious apples was completed in 1986. This followed industry concern and a downward trend in fresh apple consumption. The industry has asked the Minister to amend relevant legislation to implement the results of this research.

Two problem areas were initially identified: early in the season when prematurely marketed new season apples realised high prices, but because of inferior eating quality had an adverse effect on mainstream marketing later; and loss of quality at the end of the season associated with reduced flesh firmness, frequently as a result of excessive cool storage.

This research developed a test, based on the soluble solids content of the apples, that can be used successfully to determine when early season fruit first becomes acceptable to consumers. A flesh penetrometer can be used for fruit marketed late in the season to measure firmness and a minimum standard set that will lead to greater consumer satisfaction.

The results should be incorporated within uniform Australian grade standards that are currently being developed.

Related research started in 1983 aimed at establishing if certain maturity indices, including flesh firmness, soluble solids, starch/iodine and ethylene levels, can collectively provide an accurate index for determining optimum harvest maturity for fruit intended for cool storage. The results of this research will be known late in 1986.

Research is being conducted at Orange and the Agricultural Research Station, Bathurst, to identify preferred management options for establishment and management of pome fruit orchards. Useful economic guidelines have been provided in the past, oriented mainly to costs and returns for model orchards.

The Department helped growers to keep abreast of new technology in all aspects of production and marketing, including variety/rootstock selection, planting densities, tree training, irrigation, nutrition, disease and pest control, pre and postharvest handling, packaging and marketing.

Nashi fruit—a new commodity

Modern varieties of Nashi fruit (Asian pears) should have the potential to develop into a useful new industry. The first plantings of 7 ha were made in NSW in 1984. A further 95 ha were planted in 1985 and additional plantings will be made in 1986. Further plantings will be made as new varietal material becomes available. Small quantities of fruit may become available in 1987 from the earliest plantings.

The Department is involved with identifying suitable growing areas, variety evaluation, rootstocks and tree training performance.

There is considerable interest in production of Nashi fruit in north coastal NSW, but one important constraint will be adequate winter chilling. The Department published a comprehensive Nashi fruit advisory bulletin, *Nashi fruit—an overview*, and held a seminar to advise prospective growers and investors.

POSTHARVEST SERVICES

The major source of loss in the horticultural industry is the wastage that occurs after the product has been harvested. The value of the produce from the producer can be lowered or completely lost if the produce is destroyed by improper handling.

The gross value of production of fruit and vegetables in NSW is over \$300 million and by the time this produce reaches consumers' homes its value may be close to \$1,000 million. Losses occurring along the marketing chain are probably over \$50 million. The intangible losses to the community, represented by consumer dissatisfaction with poor quality and highly priced produce, are probably higher. Losses occur from fungal attack, internal breakdown, mechanical damage, and from being under or overripe. Much of this loss can be prevented by the development and application of new postharvest technology in the marketing chain.

Research

The aim of postharvest research in the Department is to solve problems in the storage, handling and marketing of horticultural produce and to develop better technology to maintain quality and prevent wastage.

There are two directions in this research. Firstly, problem solving in specific areas; and secondly, more basic long-term research.

Current major research projects include: quality in tomatoes; internal disorders in apples; storage of bananas at air temperature; curing of potatoes; maturity of kiwifruit; ethylene removal from storage areas; cooling of mushrooms and other produce; temperature stress on plants; ripening patterns; biological control of postharvest decay; behaviour of new fungicides; control of decay in vegetables; potato greening; cold disinfection and irradiation of fresh fruit.

Much of this work has been based on a cooperative program between the Department and the CSIRO Division of Food Research. The Department has two research officers at the CSIRO laboratories at North Ryde and three research officers at the Horticultural Postharvest Laboratory, Gosford, also a joint operation.

Advisory

The creation and filling of a position of Horticulturist (Postharvest) was a significant advancement in the services the Department can offer industry. The officer will work with both industry and advisory officers to improve postharvest quality.

A significant contribution was made to implement standards and guidelines for citrus exports during 1985–86. Further industry export standards and guidelines are being developed and will be implemented during 1986–87.

The client group for advisory work in postharvest technology is somewhat different to the traditional farmer audience. Included are packers, handlers, distributors, transporters, agents, merchants, exporters, providores, retailers and consumers. Different advisory techniques are needed because of the diverse nature of the clients.

The major thrust to pass information on to the client is by interregional programs. These programs are designed on a statewide basis, and take account of local requirements.

The major objective of the Postharvest Advisory Program is to introduce to the marketing chain new technology that will upgrade the quality of produce to the consumer.

An important aspect of this is the training of district horticulturists and agricultural inspectors in postharvest technology, and two intensive training courses have been held.

The provision of advisory material on postharvest technology for use in programs rates highly and nine Agfacts were produced. Coloured posters containing information about postharvest technology were successful in getting the advisory message across. Posters were designed for placement in the packing shed and other areas where produce is handled. Sets of posters giving details of temperature requirements for fruit and vegetables have been distributed widely throughout Australia.

STONE AND BERRY FRUITS

Industry situation

Variable conditions occurred in the spring and early summer with extended wet weather followed by an extremely dry period through the autumn. Severe hail storms caused 60–70% losses of peach and nectarine crops at Orange and also damaged isolated orchards in the Camden district. Continual rain caused serious damage in cherry crops at Young and Orange with much of the crop not being suitable for harvest.

Following is a summary of production for the 1985–86 season:

Summary of stone fruit production for 1985–86

Crop	Production (tonnes)	Comparison with 1984–85 (%)
Dessert peaches	13 000	+ 20
Nectarines	3 800	+ 75
Canning peaches	11 000	– 4
Apricots *	4 000	+ 100
Plums	8 300	+ 35
Cherries	3 200	– 1
Prunes †	3 100	equal

* includes 2700 tonnes of canning fruit

† dry tonnes

Excellent prices were obtained for good quality packs of dessert stone fruit early and late in the season. During January, market prices for peaches and nectarines declined substantially. Similarly, very high prices were

received for blueberries early in the season and again in the autumn, but January prices for the main crop were extremely poor.

The total plantings of stone fruit were 5810 ha, an increase of 27 ha since 1983. Berry fruits have increased by 52 ha to 164 ha, while miscellaneous fruits have increased by 119 ha to 384 ha. Persimmons, kiwifruit and blueberries showed the greatest increases in area.

Crop improvement

The Department maintains plantings of virus-tested plum and Mahaleb cherry rootstocks at Bathurst for supplying cuttings and seed. During the year a large number of trees in the plum block were found to be virus infected. The entire planting has now been reestablished on a new site and is expected to be in full production in two years.

In December 1985 the Victorian Department of Agriculture announced the phasing out of the Knoxfield bud multiplication unit. A new unit at Frankston will only supply a maximum of 20 buds per variety. Subsequently, industry organisations asked the NSW Department to establish a unit at Bathurst and the request is being considered.

Over the past 13 years, about 70 new low-chilling peach and nectarine varieties have been introduced by the Department. They form the basis of a new industry in subtropical areas of NSW, as well as stabilising the industry in the outer metropolitan area and on the Central and South Coasts. Twenty varieties were introduced this year. A wide range of other stone fruit varieties from overseas and other States are being evaluated in various districts and on research stations; 25 were released in 1985–86.

Production services

Advisory activities have concentrated on the establishment of improved stone fruit varieties, particularly those having export potential. Special attention has also been focussed on high density planting systems and improved control of pests and diseases. On the North Coast, considerable emphasis was placed on control of flying foxes and birds in stone fruit and blueberry plantings.

Most of the Department's research in stone and miscellaneous berry fruits is conducted at Bathurst. Research projects in canning peaches and prunes are carried out

at Yanco Agricultural Institute, Yanco. Projects at Alstonville involve low-chilling peaches and nectarines. Research in strawberries, blueberries and miscellaneous fruits is located at Gosford. Numerous stone and berry fruit trials are also undertaken by horticulturists in various districts throughout the State.

The major input has been towards variety evaluation of stone and berry fruits. Other specific areas include rootstocks for low-chilling varieties, use of growth retardants to control tree size and eliminate summer pruning, fruit thinning, tree training and high density plantings.

TROPICAL FRUITS

Bananas

Clone comparisons. Tissue culture techniques were used to compare Giant Cavendish clones at the Tropical Fruit Research Station, Alstonville. Clones compared were Williams, Bennett Williams, Dobson Mons Marie, Lindsay Mons Marie and Chinese Cavendish. The trials will also compare tissue-cultured plants with conventional planting material (suckers), various planting densities and the use of cover crops.

Plastic covers. Trials of modified atmosphere storage were conducted to assess the potential for industry. Bunches still attached to the plant and fruit packed in cartons were sealed in plastic covers. Earlier work had shown that such storage was possible and had potential to smooth-out fluctuations in supply. This research at Alstonville was associated with continuing investigations of crop forecasting and crop regulation.

Cordana leaf spot. In response to unusually serious levels of Cordana leaf spot in plantations near Macksville, advisory officers carried out field trials to test several fungicides and spray strategies. Results will be evaluated in the winter-spring of 1986.

Tropical fruit

With the expansion of tropical fruit plantings recently, many orchards are reaching bearing age and production is increasing rapidly. Macadamia, custard apple and lychee have been exported successfully and quantities will rise significantly. The Department helped form a Northern New South Wales Horticultural Council whose aims are to promote

north coast horticultural produce, encourage quality control standards, review development in horticultural industries and improve communications with growers.

Trial plantings were made throughout northern NSW to determine the climatic adaptability of a range of tropical and sub-tropical fruits.

Tea and coffee

Selected varieties of coffee were planted to assess their potential in northern NSW, compare field performance under local conditions and further investigate mechanical harvesting.

Officers gave advice on several commercial plantings of tea in northern NSW and research continued into clonal propagation of selected material. Gathering of yield and cultural performance data from departmental blocks at Wollongbar continued.

VEGETABLES

Asparagus

Yield and other data were recorded for 56 cultivars under trial at Yanco and Leeton. The most promising are the University of California selections UC 157 (an F1 hybrid), UC 157 (an F2 hybrid), UC 66, El Centro, S 328 and S 147, and a cultivar called Jersey Giant. At least 40 cultivars were eliminated from further study because of quality defects.

Mushrooms

Growers provided funds to improve the mushroom growing facilities at the Biological and Chemical Research Institute, Rydalmere, and to employ a field assistant. The Department will study mushroom strains, basic compost ingredients and compost supplements, to increase yields and overall production efficiency. Trials on supplements this year gave yield increases of 18% to 32%.

Onions

Ten cultivars were evaluated at Yanco and Somersby for suitability for use raw in salads. Three cultivars (Sweet Red Salad, Hawaiian Sweet Red and Red Grano) were recommended.

Black mould, caused by the *Aspergillus* fungus, is a serious postharvest disease of onions in NSW. Recommendations for the control of this disease have been made. The

recommendations are based on a postharvest fungicide dip followed by drying in an air stream.

Pepino

A new variety, Kendall Gold, was named and released. It was selected from seedling material grown at Gosford.

Potatoes

Cultivar evaluation. Ten potato cultivars were evaluated at seven sites throughout the State. Varieties showing the most promise are Atlantic and Tarago for crisp manufacturing and Geographe as a yellow-fleshed potato for the local and export market. Atlantic will be included in the certified seed scheme.

Seed certification. The certification of crops from growers' own seed lines continued, with 150 ha submitted for inspection from 36 growers. The disease-free status of NSW seed meant a ready market for all production.

The multiplication of seed of pathogen-tested origin continued, with about 50 tonnes of mother seed available for distribution this year. First commercial certified seed will be available in 1988.

Sclerotinia control. Sclerotinia, a fungal disease, can reduce potato yields by 50% in the Riverina. A satisfactory control program was established by the Department using the fungicide vinclozolin (Ronilan^(R)).

Tomatoes

The breeding program for fresh market tomatoes continued. Several selections in the F4 and F5 generations appear promising. They will be released in the F6 generation if their superior performance continues.

Field experiments at Yanco showed that it was possible to obtain high yields of quality fruit for the fresh market from crops grown with black plastic mulch and trickle irrigation. The cultivars Sunny, Red Chief and 83-131 were suitable for this purpose.

Other work with processing tomatoes at Yanco showed that trickle irrigation can give higher yields of better quality fruit (higher soluble solids content) than furrow irrigation. This result was achieved with less than half the normal amount of water.

Vegetable variety evaluation

Evaluation of current, new and promising varieties of watermelons, rockmelons, carrots, snow peas, broccoli and broad beans was undertaken at Gosford. Important developments were the identification of industry interest in small watermelons, green-fleshed rockmelons, hybrid carrots and a high-yielding snow pea variety.

Hydroponic production

Production in soilless systems increased with about 40 commercial and semi-commercial units in operation in coastal NSW. Lettuce is the major crop produced; other crops are strawberries, carnations, roses, chrysanthemums, tomatoes, cucumbers and ferns.

VITICULTURE

Crop improvement

The MIA Vine Improvement Society, which was formed to supply approved and selected grapevine cuttings to the industry, cut and sold over 1 000 000 cuttings during its second full year of operations. The Sunraysia (NSW) Vine Improvement Society supplies dried vine fruits varieties and in its first year of formal operation supplied 188 000 cuttings of Sultana, Muscat Gordo Blanco and Zante Currant. The Department is represented on both Societies, which handle such matters as the selection and propagation of mother vines, and establishment and periodic inspections for trueness to type.

Clonal evaluation of improved strains of varieties continued. The wine variety Malbec was introduced to the list of approved source varieties under the Horticultural Stock and Nurseries Act. New registered mother vine plantings (RMVP) of selected clones of Sauvignon Blanc, Trebbiano, Semillon, Pinot Noir, Taminga, Chambourcin, Chardonnay, Gordo, Gamay, Durif, Shiraz, Red Emperor, Flame Seedless, Loose Perlette, Black Monukka and MS-29-11, and rootstocks Ramsey, K51/32 and Dogridge were established.

Because irrigation infrastructure and limitations to water supply restrict the development of new irrigation land for grape growing in Sunraysia, Sultanas are being replanted on previously planted land that is infested with nematodes, so vines propagated on grafted resistant rootstocks will become increasingly important.

Production services

The first crop was harvested in 1985 in a trial at the Agricultural Research and Advisory Station, Dareton, to determine optimum irrigation applications and intervals for own-rooted and grafted Sultanas. Own-rooted vines yielded 11.3 kg per vine and those grafted to Ramsey rootstock yielded 27.8 kg per vine. In 1986, own-rooted vines yielded 27.7 kg per vine and those grafted yielded 38.9 kg per vine or about 54 tonnes per ha. Differential irrigation treatments were imposed during the 1985–86 growing season for the first time.

The relationship between the yield of Sultana vines and salinity level of the irrigation water has been studied at Dareton since 1981. Five treatments, ranging from normal river water (240 ppm) to water with 2160 ppm total dissolved salts, were applied. When irrigated with the most saline water, yield was reduced by 52% in the third season and 56% in the fourth. In some parts of the trial, especially where internal soil drainage was poor, many vines died.

In a trial at Dareton to compare the effects of four trellis systems on ordinary Sultana vines and on rootstocks (started in 1978), the highest production came from Ramsey rootstocks trained to a swing-arm trellis. This research will finish in 1987. Results supported growing the fruiting canes on alternate sides of the row each year. The highest quality dried grapes also came from this treatment.

In a trial at the Horticultural Research and Advisory Station, Griffith, to determine the minimum number of irrigations that can be applied to maintain yields of winegrapes, reducing the number of irrigations from nine to one had no effect on yields in 1985, but reduced yields by 17% in 1986.

Reducing the number of irrigations to two had no effect on yields in 1986.

A soil management treatment of forming a large bank under the vines increased yields by 41% in 1986, although this is the first increase in yield since the trial was established in 1982. In 1985 the soil treatment increased vegetative growth by 70%.

The Department established nitrogen fertiliser trials on commercial vineyards in the MIA to assess the suitability of juice arginine concentration as an indicator of vine nitrogen requirements. Vines on 12 of the 17 farms responded to nitrogen fertiliser and yields increased up to 40%. Yields ranged from 18 to 65 tonnes per ha and the response to nitrogen fertiliser occurred when arginine concentrations were less than 300 $\mu\text{g/mL}$. So, arginine is suitable as an indicator of vine nitrogen requirements.

Poor water penetration is a major irrigation problem in the MIA. At 21 district sites, soil moisture was monitored by research and advisory officers during the growing season with a neutron moisture meter. Nearly half of the sites had severely reduced water penetration at some stage during the irrigation season. Poor water infiltration is due to both irrigation management and soil characteristics.

Advisory work included the evaluation and adoption of alternative pruning methods, quality of dried vine fruits production, nutritional status and requirements for grapevines, promotion of low-level sprinkler irrigation systems, improved soil management through mulching, and development of grower expertise in grafted vine propagation when replanting.

A three-day viticultural seminar was held at Tocal to keep vineyard managers and owners up-to-date with grape-growing techniques.

FIELD CROPS AND PASTURES

CONSERVATION FARMING

The Department of Agriculture and the Soil Conservation Service have started a major joint conservation farming program. The program aims to manage agricultural resources in the State to ensure sustained agricultural production. Land degradation is perhaps our most serious environmental problem.

About 91% of the agricultural land in NSW has suffered from either chemical or physical degradation or both.

The program is being conducted at two distinct, but complementary levels: community awareness and farmer adoption. In addition, specific programs have been developed for 'trees on farms', 'improving the produc-

tivity of acid soils' and 'salinity reduction'.

Recommended conservation farming practices will be consistent with the following principles: minimum cultivation; retention of crop residues; pasture upgrading and improved grazing strategies; use of appropriate crop rotations; regeneration and establishment of trees; sound irrigation practices; careful and proper use of chemicals; and attention to feed resources for drought protection.

Advisory

The farmer adoption aspect of the program has rapidly gained momentum through the activities of seven Regional Conservation Farming Committees, supported by research and advisory officers from both organisations.

A wide range of activities has taken place across the State under the program including: 90 field days; 25 seminars/meetings; 150 press releases; 100 radio broadcasts; 20 television broadcasts; 35 information sheets; 10 newsletters; 50 demonstrations/trials; and 10 major displays/exhibits.

Demonstrations of the integration of conservation farming practices within the context of the whole farm, together with case studies and specific trials, have been established in each region to help the advisory campaign. In most regions, multidisciplinary teams have been formed to promote conservation farming practices on a district or industry basis.

The focus of the Department's salinity program has broadened during the year through involvement in three working groups for the Murray-Darling Basin Ministerial Council directly related to irrigation salinity and waterlogging.

Irrigation scheduling can have a major effect in reducing waterlogging and accessions to groundwater, as well as improving productivity. Data for daily crop water-use have been widely published. Major emphasis has also been placed on whole-farm planning with correct drainage through the use of competitions to select examples of farms using appropriate technology.

There has been a high level of farmer interest and departmental activity in relation to soil acidity and its reduction through the application of lime. Despite the adverse economic conditions, lime use in most areas

where acid soils are a problem has been maintained or increased.

All landholders in areas with acid soil problems were sent a copy of the Agfact *Liming problem acid soils*. A video on soil acidity and liming was prepared by the Department with funding assistance from the Australian Wool Corporation.

In all regions there have been major cooperative activities associated with the trees on farms program, including seminars, field days, major displays, press releases and distribution of publications. In the Murray and Riverina Region, 10 commercial farming properties are being developed as demonstration farms. In other regions, demonstration plantings have been established on departmental research stations and Soil Conservation Service centres.

A three-day residential short course on tree establishment is run annually at Murrumbidgee College of Agriculture and has proved very popular with farmers and others associated with tree planting.

Research

Research officers across the State continued to make a major contribution to the conservation farming program through their efforts to develop sustainable farming systems.

The no-tillage program in northern NSW has continued to generate positive results in the comparison of no-till crop establishment techniques, cultivation with stubble retained and cultivation with stubble burnt. Elimination of tillage is improving soil structure on the trial sites, while equivalent wheat yields have been obtained on most sites each year.

Adoption of no-tillage techniques will be primarily dependent on the costs of fallowing using herbicides compared with cultivating, and on the availability of advice to successfully implement the system. A no-tillage wheat fallow is still usually more expensive (operating costs) than cultivating, but the difference is diminishing. No-till sorghum is commercially viable now, especially if a yield advantage is achieved, while no-tillage techniques have also been shown to successfully enable opportunity cropping.

Research at the Agricultural Research and Advisory Station, Condobolin, examined replacing cultivation with herbicides and evaluated stubble retention systems. Results

showed that:

- after a pasture phase, long cultivated fallows gave higher grain yield than no fallow, but with a high risk of soil erosion and soil structural decline
- the replacement of tillage with herbicides for long fallowing gives equal soil water storage and nitrogen mineralisation, but lower wheat yields for reasons that are still being investigated
- for stubble cropping systems, stubble retention consistently gives higher yields due to improved moisture availability.

Soil conserving farming systems for southern NSW are well established and proven using direct drilling techniques. Research work is continuing at Wagga Wagga to refine these systems, particularly with regard to stubble management and various crop rotations. Retention of stubble over the summer months increases water infiltration and improves water storage for subsequent crops. If stubble is to be burnt, it should be done as late as possible, thereby reducing problems at sowing while achieving many of the benefits of retaining stubble.

At the Agricultural Research Station, Cowra, there is a research project to assess the soil physical and biological factors limiting wheat yields under conservation tillage. Particular emphasis is being given to the problems of poor early plant growth often observed under reduced/no-tillage systems.

Many other research programs are underway around the State, including assessment of direct drilling techniques for pastures and fodder crops, assessment and modification of machinery for conservation tillage and establishment of cover crops under bananas and tree plantations.

A range of low-stature legumes was tested for use in banana and tropical fruits plantations. These legumes reduce erosion and weeds while increasing soil organic matter. Some species show outstanding promise, with dwarf types reducing the need for frequent mowing. The acid soil research program aims to define which acid soil factors are involved in reducing plant yields and to establish the extent of yield reductions in different soil, crop and pasture conditions. Various means of measuring soil acidification rates are also being investigated.

Consistent responses of subterranean clover-based pastures to lime have been

measured on acid soils with exchangeable aluminium levels of 10% or greater. On some soil types, particularly in the Central Tablelands, responses have been smaller.

Responses of wheat and barley to lime on similar soils have been greater than for subterranean clover.

On the most acid soils, such as the earthy sands of the Pilliga area, liming the surface soil is of little benefit. However, recent research has demonstrated the economic value of tolerant species and varieties such as triticale, aluminium-tolerant wheat varieties, and acid-tolerant pasture legumes such as Serradella.

The emphasis of the acid soils research program at Wagga Wagga, Rydalmere, Canberra and Tamworth is on developing better means of predicting crop and pasture responses to lime. These results will be incorporated into a 'lime-it' farm management computer model to determine optimum economic rates of lime application for farmers.

Research into aspects of salinity and waterlogging has continued with the main emphasis being in: efficient water use; variety and cultivar tolerance in vines, citrus and barley; land preparation; measurement of soil salinity by ground instruments and remote sensing; and the effects of saline water on soil characteristics and plant growth.

Research associated with the trees on farms program includes investigation into mechanical transplanting of tree seedlings and direct seeding, continued research into dieback, and the development of a technique of taking inventories of tree cover using Landsat imagery.

Education

The community awareness aspect of the program was well supported with country radio and television stations giving the specially prepared conservation farming radio tapes and videos considerable air play.

Three conservation farming booklets for the northern, central and southern portions of the State were widely distributed to landholders.

Conservation farming display boards, posters, bumper stickers, envelope stickers and year planners were developed and used to complement the community awareness campaign.

FIBRES AND OILS

Cotton

Departmental scientists, in conjunction with those of the CSIRO, continued to develop and refine SIRATAC—a computerised management program for cotton.

Research into bacterial blight was increased in an effort to reduce crop losses from the disease. Losses were measured, tolerance of varieties and breeding lines to the disease assessed, and the epidemiology of the disease studied.

Advisory officers promoted adoption of the variety Siokra and of an improved US variety Deltapine 90. These two varieties were virtually the only ones planted in 1985–86. Siokra, a recent variety release from CSIRO, has higher yields, increased fibre strength and better resistance to insects and disease than previous varieties. The improvements make the crop more profitable and more marketable.

Active promotion of the Synthetic Pyrethroid Strategy resulted in almost all growers adopting it. This has prevented a complete breakdown of synthetic pyrethroids in controlling the major cotton pest *Heliothis* (*Heliothis armigera*).

Soybean

Widespread nodulation problems in first-year crops in central and southern irrigated areas in 1984–85 were largely overcome in 1985–86 following a well organised advisory campaign by district agronomists.

Programs on water scheduling and improved irrigation management increased crop yields.

Promotion of the Department's recently released dryland cultivar Valder has resulted in further expansion of soybeans as an alternative dryland crop to sunflower and grain sorghum on the North West Slopes. Unfortunately, a very dry summer resulted in low yields of dryland crops.

Safflower

Departmental officers and CSIRO staff assessed advanced lines from CSIRO's breeding program. Two breeding lines from this program are being considered for release as varieties. One line has good resistance to *Alternaria* disease while the other has good tolerance to *Phytophthora* root rot.

Sunflower

By expanding their evaluation of commercial and experimental hybrids on the North West Slopes and Plains, district agronomists have been able to provide a more comprehensive guide to growers on the choice of variety.

Rapeseed

The *Brassica campestris* variety Bunyip, developed at Wagga Wagga, was released. It has higher seed and oil yields, better disease resistance and better oil quality than Jumbuck, the variety it will replace.

The trend, however, is towards the higher yielding *Brassica napus* varieties. At Wagga Wagga the breeding program has been able to combine high levels of yield, seed quality and disease resistance in a single variety. Two such varieties are undergoing advanced testing with intended release in 1988.

Production increased threefold on the previous season, from 15 551 ha and 16 306 tonnes in 1984–85 to an estimated 45 000 ha and 50 000 tonnes in 1985–86. Irrigated plantings, mainly in central and southern areas, contributed significantly for the first time. District agronomists advised a large number of new growers, particularly in the irrigation areas. A 5000 ha crop was grown on a lakebed near Wilcannia for the first time.

Jojoba

Research at Condobolin suggests that prospects for jojoba as a profitable crop in inland NSW are better than recent commercial experience would indicate.

Only about 10% of plants grown from seed collected from wild stands are consistently productive. Many are totally unproductive. However, initial plant crosses have shown that substantial gains are likely from a breeding and selection program to develop varieties more suitable to the NSW environment. In 1985–86, an excellent season, the most promising clones yielded 400–500 kg/ha of clean seed.

In comparison, unselected material grown from wild seed produced only about 80 kg/ha, with 70% of this coming from the best 10% of plants; 25% of plants producing nothing at all.

In 1984–85 there were 765 ha of jojoba and two growers, but no production. The first commercial plantings were in 1979 and would now be producing if more productive

varieties had been available. Advisory officers continued to advise potential growers of the risks of investing in the crop using current planting material.

Guayule

The effects of planting density on rubber production and the use of ratooning as a management technique were studied. Regular harvests will be made until 1988 when the current program should be finished. A full evaluation of results will then show whether the crop has potential as a commercial proposition in NSW.

Tea tree oil

Oil production from tea tree (*Melaleuca alternifolia*) continued to attract substantial interest. The domestic market continued to expand, but access to the potentially more lucrative export market is still limited. This is because the therapeutic value of the oil is still not recognised on most overseas markets.

GRAIN PRODUCTION

Background

New South Wales produces about one-third of the national wheat crop. The State is fortunate in having a range of climatic conditions. This not only allows it to produce the widest range of wheat qualities, from soft biscuit to prime hard types, but also enables the production of a range of cereal and legume grains, both summer and winter growing.

Grain production is coming under increasing pressure. It is facing the classical cost-price squeeze, with rising on and off-farm costs, and falling grain prices from

international competition with the European Economic Community and United States.

Faced with declining market prospects for wheat, many farmers are looking for alternative uses for their land and machinery. There has been considerable interest in grain legumes, including chickpea (*Cicer arietinum*), pigeon pea (*Cajanus cajan*), field pea (*Pisum sativum*), cowpea (*Vigna unguiculata*), mung bean (*Vigna mungo*) and a number of *Vicia* species.

Growers, merchants and the Department are jointly evaluating new crops, developing grain standards and actively seeking domestic and export markets. The move towards these crops is being stimulated by the current shortage of high-protein grain on most world markets. This shortage is caused largely by the movement of such countries as India and Turkey from legume grain-growing to wheat growing and by the huge surpluses of low-protein wheat in the European Community.

Production

Movements between the various grain crops can be seen from the following estimates for the 1985-86 and 1986-87 seasons.

The projected reduction in the two main traditional winter cereals, wheat and barley, is being offset by an increased planting of oats, triticale and grain legumes. The renewed interest in wool production is placing new emphasis on the dual-purpose grazing and grain attributes of oats. The ability of triticale to attain higher yields on light and acid soils is being more widely recognised and lupin and field pea areas are increasing in response to the current overseas demand for high-protein grain for both human and livestock consumption.

Estimated movements in grain crop production and area 1985-86 and 1986-87

Winter crops 1985-86						
	Wheat	Oats	Barley	Triticale	Lupins	Field peas
Production (t)	5 702 000	766 000	1 013 000	275 000	98 000	31 000
Area (ha)	3 717 000	471 000	560 000	118 000	70 000	21 000
Winter crops 1986-87 (estimate)						
Area (ha)	3 528 000	645 000	501 000	144 000	60 000	30 000
Summer crops 1985-86						
	Rice	Sorghum	Maize	Cowpeas	Mungbeans	
Production (t)	670 000	346 000	102 000	2 900	3 300	
Area (ha)	105 000	152 000	18 000	4 900	2 100	

Crop improvement

The Department's plant breeding programs have continued to develop higher yielding varieties with improved disease resistance and agronomic characteristics. The wheat variety Rosella, developed at the Agricultural Research and Advisory Station, Temora, was released during the year and will provide growers with greater sowing flexibility. Other crossbreds in the Temora program show much promise and include lines of full winter habit. At the Agricultural Research Institute, Wagga Wagga, improved barley lines were evaluated. These lines also include long-season varieties suitable for early sowing and dual-purpose grazing and grain use.

A hybrid maize variety, GH5009, developed at the Agricultural Research and Advisory Station, Grafton, yielded exceptionally well and made a major contribution to production in the inland irrigation districts.

Selection and testing procedures were completed on two chickpea varieties, which are being registered. The chickpea program has moved from Wagga Wagga to the Agricultural Research Centre, Tamworth, and the field pea program consolidated at Wagga Wagga to make best use of resources and be closer to potential major production zones.

Production services

All 63 district agronomists in NSW were engaged in grain production programs. Over 200 variety evaluation trials were conducted to assess yield, agronomic and quality performance of the full range of cereal and legume cultivars available. In addition, on-farm trials were established to investigate new cultural practices, evaluate newly released agrochemicals and determine crop nutritional requirements. Well attended field days were held on many of the trial sites.

Producers now have access to detailed information on grain crops through the companion series of annual publications including sowing guides, and weed and pest control booklets.

Extra help was provided for district agronomy investigations and demonstrations, particularly in the form of more mobile planting and harvesting units and field soil-testing kits.

IRRIGATION

Extent of production

The estimated area of irrigated production in NSW using surface water supplies is 770 000 ha, about 40% of the national total.

About 480 000 ha of crops were irrigated in government schemes and 290 000 ha were privately irrigated from surface water. An additional area of about 50 000 ha was irrigated from groundwater. About three-quarters of all irrigation is through surface application.

The gross value of production from irrigation was about \$800 million.

Advisory

The Department offers comprehensive production advice to irrigators through the involvement of special officers in irrigation, engineering, soil science, agronomy and horticulture.

The Department's irrigation efficiency program recognises the whole-farm approach as important to successful irrigated production. Components of the program were the continued development of remote monitoring equipment to record weather conditions at Deniliquin and Yanco, and the experimental use of weirs near Dubbo to measure water flow.

Irrigation specialists developed a computer model based on a published Food and Agriculture Organisation (FAO) model to calculate the water requirements of crops and the interval between irrigations, using daily weather information collected at departmental research stations at Dubbo, Griffith, Yanco and on the North Coast.

The model was used to advise district officers how prevailing weather conditions were likely to affect the frequency of irrigation.

The promotion of irrigation scheduling continued through various technologies such as tensiometer readings in suitable soil under horticultural production near Coffs Harbour and Lismore. Tensiometers measure soil moisture content, which is crucial in determining when irrigation should occur.

A major advisory program to overcome land salinisation and Murray River salinity started. The program aims to change on-farm practices to reduce deep drainage to the watertable under intensive irrigation. The widespread adoption of improved irrigation

practices such as landforming will be a key factor in reducing the volume of water percolating to groundwater and so overcoming salinity problems in the long term. The components of the advisory program include irrigation scheduling, farm layout to match soil type, selection of appropriate crops and crop rotations, planting rice on suitable sites, appropriate attention to on-farm drainage and water reuse, use of soil ameliorants and integration of advice given by various disciplinary specialists.

A meeting of State and Commonwealth Ministers formed the Murray-Darling Basin Ministerial Council to direct coordinated action to reduce land degradation and general pollution. Departmental staff spent some time preparing information and advice for the Council. Matters covered included possible institutional arrangements for land and water management in the Basin, strategies for better management of irrigation land and strategies for managing river salinity levels.

The Department's irrigation section will be increased by the transfer of some Farm Water Supplies staff and functions from the Water Resources Commission, effective from 1 July 1986.

This transfer of staff will provide irrigators with multi-disciplinary whole-farm advice about irrigation production and contribute to improved irrigation farm productivity.

The Department also started a joint investigation with the Irrigation Association of Australia studying the production constraints to greater irrigation farm profitability.

Research

Irrigation research continued at 20 departmental centres, covering a number of related disciplines.

The Department's research programs in irrigation are mainly related to the production of specific crops. At Yanco and the Agricultural Research Centre, Trangie, field crop research examined the sensitivity of different crops to water stress at various times of their growth.

At Dareton, the interaction of rootstocks and salinity tolerances was studied. Research on tillage practices and soil treatments under irrigation in troublesome soils continued at Narrabri, Trangie and Deniliquin.

At Dubbo, there was a limited investigation of on-farm water conveyance technology.

Research reviews started in the Murray and Riverina, and Orana and Far Western Regions to plan future projects.

The Department investigated the value of production lost through land salinisation and waterlogging. As much as \$50 million may be lost annually in irrigation areas in the Murray and Murrumbidgee Valleys.

PASTURES

Crop improvement

Lucerne. A lucerne breeding program at Yanco has produced Nova and the newest variety to be registered, Aurora, seed of which will be available in 1987.

Aurora is a moderately winter-active, general purpose lucerne for both dryland and irrigation, which combines a high level of resistance to spotted alfalfa and bluegreen aphids with high resistance to *Phytophthora* root rot and *Colletotrichum* crown rot diseases.

Two other varieties are in advanced stages of development. One is a highly winter-active type that has resistance to leaf, root and crown rot diseases as well as to aphids. It will be suitable for hay production in coastal and highly humid environments where leaf diseases seriously hinder production. The second is a breeding line that has been developed from CUF101 and has proved to be consistently more productive and winter active than any germplasm previously tested. It has been outstanding under dryland grazing management because it grows in response to rainfall at any time of the year.

Five breeding lines, which have superior persistence under severe grazing compared with the current commercial varieties, have been selected. Superior clones have been identified and are currently in recombination before screening for disease resistance.

Evaluation of recently released lucerne cultivars for their commercial potential (resistance to disease and pests, persistence and production) is conducted at five primary sites and 18 core trials throughout the lucerne-growing districts of the State, including Tamworth.

The level of the oestrogenic compound, coumestrol, is low in all lucerne varieties, but

in response to stress such as leaf diseases it may rise to levels that could cause reproductive problems in grazing animals.

Subterranean clover. The Department participates in the National Subterranean Clover Improvement Program. Subterranean clover strains provided by the breeding program in Western Australia are systematically evaluated at Wagga Wagga and Temora. A research agronomist supervises the intensive research at these centres and nine district sites, as well as supervising 18 core trial sites throughout NSW. Measurements were made of seed reserves, seedling density, dry matter yield and persistence.

The release of the varieties Junee and Karridale are two significant achievements of this work.

Annual medics. In conjunction with the Department of Agriculture in South Australia, a wide range of *Medicago* species was tested at Tamworth and Condobolin, and supported by core trials in the medic-growing areas of the State. The varieties Sephi and Paraggio are releases from this program.

Red clover. Two cycles of selection were made on the low oestrogenic red clover, Redquin, in an attempt to develop a new red clover variety that has a high resistance to crown rot diseases.

Serradella. Two lines of Serradella that will improve pasture production in sandy acid soils have been identified from the evaluation program at Trangie. Quantities of seed will be provided for wider evaluation with the aim of releasing the lines commercially in 1987.

Native grasses. Research is undertaken at Glen Innes and Tamworth in close cooperation with the Soil Conservation Service of NSW and the University of New England in an effort to domesticate promising native grasses. *Agropyron scabrum*, *Danthonia racema* and *Danthonia linkii* are the most promising species. Vegetative material and seed has been collected for selection and testing.

An interregional advisory program is aimed at improving the advice and recommendations provided on pasture species. Advisory staff cooperate with research officers to conduct core trials. The trials during the year measured persistence and perform-

ance of lucerne, subterranean clover and medics at specially chosen sites throughout the State. The results are used to update a chart of pasture recommendations and appropriate Agfacts.

Advisory staff from all regions attended a lucerne workshop at Yanco in April.

Production services

Research highlights in 1985-86 were:

- In the Western Division, survey work on vegetation in response to grazing management was undertaken. In particular, the effect of sheep and kangaroo grazing on the vegetation in the soft red country is being investigated.
- Merit testing of pasture species and research on reestablishing pastures in the cropping rotation was undertaken at Walgett.
- At Wagga Wagga research to determine the major factors associated with soil acidity was undertaken. Subterranean clover is limited by a direct effect of low soil pH, the associated toxic levels of aluminium and manganese and the secondary effects of soil acidity on *Rhizobia* nodulation, and increased susceptibility to most diseases. These factors have been incorporated in an advisory computer model called 'lime it', which helps landholders decide the most economical rate of lime to apply for a particular enterprise and for conservation management.
- At Glen Innes graziers were encouraged to plant more trees in the New England region by identifying the most persistent tree species. Screening of pasture species and mixtures for persistence and productivity will identify the most productive pastures for the area from the tablelands to Inverell. Growing wheat for grazing and grain is being tested as a source of winter feed and an alternative source of income to grazing alone.
- On the slopes, research concentrated on investigation of *Trifolium brachycalycinum*. Two lines show particular promise.
- Control of the important weed purple wiregrass (*Aristida ramosa*) has been developed through grazing strategies. The use of fire as an additional control factor is being investigated.
- In some trials *Danthonia linkii* is more persistent, more productive and better able to colonise than phalaris.

- Sephi medic (*Medicago truncatulata*) has proved to be the most persistent and productive medic replacement for the aphid-susceptible variety, Jemalong.
- At Orange, the improved definition of the production patterns of temperate pastures was studied. Related projects in grasses have shown a strong relationship between winter production and the time when reproductive development starts.
- At Canberra, experiments with deep tillage had varied results. Increased pasture production from deep tillage was related to improved water infiltration after the autumn break.
- The use of trees for animal fodder was studied at Canberra. Preliminary results show that Tagasaste (*Chamaecytisus palmensis*) was able to tolerate dry conditions better than other trees studied.
- At coastal sites, perennial ryegrass was not affected by a 50% drop in available water, but the leaf extension rate declined. Most of the water used came from the top 30 cm of soil. The most productive annual and perennial ryegrass varieties were Concord, Midmar, Richmond and Tetila.
- Matua prairie grass (*Bromus willdenowii*) was an outstanding dairy pasture grass in trials at Bega, Taree and the North Coast.
- At Berry, the control of slugs significantly increased the establishment of direct drilled pastures. Slugs were most active in areas where trash was plentiful.
- Perennial ryegrass, phalaris, fescue, kikuyu, paspalum and setaria were successfully established by broadcasting the seed into mature soybean crops on the North Coast.
- Cropping has proved an economical venture for graziers on the far South Coast. In some cases, returns from cropping were greater than from beef production. Research is continuing on overcoming the problem of barley yellow dwarf virus and reestablishing pastures following a crop phase.
- Identification of economical rates of lime to reduce acid soils was undertaken at Berry and Taree. At Canberra, research showed large responses to a wide range of alternative soil ameliorants including industrial waste products.
- Response curves determined with fertilisers at many NSW locations have been the basis for the development of mathematical

models. Some of these models are now used by farmers to help them make decisions about fertiliser rates, stocking pressure and fodder budgeting. At Wollongbar, a team of researchers is developing models for grazing industries. In NSW, models are available for beef, sheep and wheat enterprises, and new research is being conducted on systems for rainfall prediction, pasture growth and animal-crop integration.

Workshops have introduced advisory officers in the dairy farming districts to fodder budgeting. Agronomists and dairy officers have established pilot schemes with farmers at Casino, Lismore and Nowra.

The 'Agplan' computer models for beef, sheep and wheat production were introduced to many advisory staff at workshops held at Glen Innes, Orange and Goulburn.

To ensure more reliable estimates of pasture quality and production, advisory staff attended workshops at Wagga Wagga, Yanco, Wellington, Tamworth and Tocal where relationships between pasture quality and animal production were outlined.

REMOTE SENSING

Advisory

Data obtained by remote sensing (that is, by satellite) are used routinely for mapping areas for agricultural suitability, and by district officers on the western plains. Agricultural suitability mapping has been completed for about five million hectares over the last 12 months. The use of Landsat data for this work results in considerable cost savings over alternative mapping methods. Landsat is an orbiting earth resources satellite that produces images of all parts of the globe every 16 days. These images can be processed to get information relevant to agriculture.

The district agronomists at Nyngan and Walgett routinely use Landsat data to improve their knowledge of local conditions and to liaise with farmers. Advisory officers estimate that use of the data improves their productivity by more than 10%. During the year, another five district agronomists started to use the data, based on the experience gained at Nyngan and Walgett.

The use of remote sensing in the north-west is supported by a major program that trains district agronomists in techniques



Advisory officers Doug Hocking (standing) and John Salvestrin were able to advise potato growers on cultivar evaluation, seed certification and sclerotinia control, from major programs undertaken by the Department.

of visual interpretation, enabling them to identify winter cropping areas and store the information in a database. The next step will be to identify and store all summer cropping information. Once operational, the database can be analysed for crop area, crop history and rotations, and long-term trends. The program has attracted support from the Rural Credits Development Fund to establish the geographic database system on the Department's computer network, which will make it readily accessible to district officers.

A program was begun with the Western Lands Commission to monitor cropping and clearing in the Western Division of NSW. Initially it will be developed over two years for the Hillston and Balranald areas, and then be extended to the rest of the Division. The program will provide cost-effective information that can be used to improve advisory services.

Mapping tree cover has been successful in the Gilgandra area. The data can be used to estimate isolated tree areas of larger than 0.2 ha with accuracies better than 75%. As the area increases, accuracy improves to better than 95%. Discussions have been initiated with the Soil Conservation Service on using this method to assist in managing the State's tree resources.

Research

Remote sensing technology is being used as the basis for a weed detector to activate individual nozzles on a herbicide spray boom discriminating green vegetation from other covers within the nozzle impact area. The prototype, funded by the Wheat Research Council, is being evaluated at Tamworth. Preliminary results are very promising, indicating a likelihood of reducing herbicide quantities used in no-till and minimum-till cultivation.

The experience gained in rice and wheat monitoring has shown that the complex nature of the physical environment will require sophisticated systems to routinely and reliably extract multiple sets of information from remotely sensed data. This has led to a cooperative monitoring program with the Western Lands Commission. It is also the basis of departmental initiatives to foster cooperation and collaboration between remote sensing groups in NSW and other organisations that require additional

management information from the same data.

The specialised systems that evolve will be designed to exploit local agricultural and environmental characteristics in extracting the required management information. Remote sensing is thus more likely to be a regionally oriented management tool than an industry-oriented one.

The Department is responsible for developing a monitoring program of the tree crops (rubber, oil palm and coconut) in Malaysia under the auspices of the Federal Department of Science.

SEEDS

Production services

The number of plant varieties from which certified seed is available to NSW farmers has increased substantially in recent years due to the success of plant breeding programs in wheat, oats, barley, triticale, maize, rice, oilseed and grain legume crops, and in pasture grasses and legumes. From 10 varieties of four species in 1960, the range has grown to about 100 varieties of 40 species. Within a crop type there are often many varieties that are similar in appearance, but that differ in important characteristics such as pest or disease resistance, productivity, persistence, drought tolerance or toxicity to livestock.

The Department protects seed supplies to farmers by:

- conducting seed certification and registered seed schemes
- conducting a seed analytical laboratory to test seed germination and purity
- providing a technical advisory service to seed producers
- advising seed buyers (farmers) of the need for quality seed
- administering the Seeds Act, 1982
- cooperating with quarantine authorities by inspecting seed imported into the State (from overseas) for undesirable weed seeds and disease
- conducting research into seed production problems and other matters limiting seed production within the State
- consulting with other States and international organisations, such as the International Seed Testing Association and the Organisation for Economic Cooperation and Development (OECD), to ensure the technical adequacy of programs

- consulting with industry at all levels to ensure the relevance of the Department's policies and to make sure stated goals are achieved.

The seed production research program covers the following topics.

Lucerne. The water requirements of the reproductive lucerne plant are being studied to improve irrigation efficiency and seed yields. Studies of lucerne nectar characteristics as influenced by irrigation and as they affect pollination, have been started. Entomologists are investigating the lucerne seed wasp to develop crop management and control systems. Nine lucerne cultivars are being studied to determine any significant differences in yield potential for seed, and several weed experiments are in progress in commercial lucerne seed plantings throughout the State.

Recent changes to certification rules and the introduction of the Seeds Act in 1982 mean that seed containing certain weed seeds must be labelled accordingly. The introduction of many new herbicides means the continuation of work to improve the control of weeds in lucerne seed crops.

Grasses. Research at Albury and Inverell studies the most efficient method of applying nitrogen by relating it to the stage of crop development. There is also an on-going weed control program in phalaris.

Kangaroo Valley perennial ryegrass is an ecotype that may only be produced in the area around Nowra on the South Coast. The crop is presently the subject of intensive research to develop an understanding of the basis for seedcrop management.

Other pasture legumes. The grazing management recommendations offered to seed growers of subterranean clover have been poorly researched. A balance is sought between the flower (and hence seed) losses due to late grazing and those that result from the excessive production of vegetation in early closed crops. One experiment started in late 1985 and experiments into grazing management started at Condobolin during the year.

Seed production methods were studied for several new or difficult herbage legumes including pintoï 'peanut' (*Arachis pintoï*), joint vetch (*Aeschynomene falcata*), kenya white clover (*Trifolium semipilosum*) and several as yet un-released *Trifolium* species. This research includes reproductive physiology, seed yield potential, herbicide tolerance, seed production and harvesting technique.

Weed control in red (*Trifolium pratense*) and white clover (*Trifolium repens*), subterranean clover (*Trifolium subterraneum*) and the annual medics was an important subject of research at various sites.

Certified and pasture seed production in NSW (tonnes)

Crop	1978-79 *	1981-82	1982-83	1983-84	1985 †
Subterranean clover	1 191	303	34	609	421
Annual medics	23	-	-	-	na
Lucerne	63	192	139	64	143
Other clovers	56	66	104	99	129
Temperate grasses	442	5	57	335	260
Tropical grasses	-	3	1	13	84
TOTAL	1 775	569	335	1 120	1 037

* 1978-79 was used as a base year to indicate pre-drought production levels

† 1 December-30 October

Registered cereal seed production in NSW (tonnes)

Crop	1981-82	1982-83	1983-84	1984-85
Wheat	5 222	4 748	8 433	7 280
Oats	804	760	601	1 050
Barley	1 200	748	1 083	1 295
Cereal rye	1	-	-	-
Triticale	167	85	238	714
TOTAL	7 394	6 341	10 355	10 339

Certified seed production of grain legume, oilseed and hybrid maize crops in NSW (tonnes)

Crop	1981-82	1982-83	1983-84	1985 *
Lupins	123	21	219	208
Adzuki beans	5	5	-	344
Field pea	-	-	-	30
Soybean	8	31	-	30
Oilseed rape	44	31	11	219
Maize	90	162	60	67
Chickpea	40	-	-	1
Mungbean	-	12	-	18
Faba bean	-	-	-	157
Cowpea	-	-	-	38
TOTAL	310	262	290	1 112

* 1 December-30 October

Apart from the general agronomic advisory services available through district agronomists, specialist seed production staff are located at departmental offices in Albury, Wagga Wagga, Temora, Cowra, Forbes, Dubbo, Inverell, Coffs Harbour, Taree and Nowra.

Although the Seed Testing Laboratory has a specialised function, it has increased its advisory function by visiting major field days and demonstrating seed-testing techniques. This has enabled farmers outside the Sydney region to gain an insight into seed testing.

Seed certification

Seed of most publicly bred herbage, cereal and field crops is produced under voluntary departmental supervision in accordance with the requirements of the certified seed rules and, for winter cereals, the registered cereal seed rules. Quantities of major crop seeds produced are listed in the tables.

Regulatory

The Seeds Act, 1982, administered by the Department, requires that all seed buyers in NSW be provided with a description of minimum guaranteed quality for each seed lot.

Since its introduction in December 1983, emphasis has been placed on educating seed producers, cleaners and retailers on the requirements of the Act, and the farming community in general on its existence and benefits. No prosecutions were undertaken during that time.

There is widespread awareness of the labelling provisions of the Act amongst farmers who are becoming selective in their choice of seed. Seed laboratory records show that there is a greater demand for seed test-

ing services since the implementation of the Act.

The Department also administers the registered cereal seed scheme and the certified seed scheme. These schemes were developed in accordance with international procedures to produce pure seed of over 100 significant crop and pasture cultivars.

Diagnostic

The Seeds Laboratory in Sydney provides a seed analytical service testing about 5000 samples each year. Tests are for physical purity, weed seed content and germination. Samples of imported seed and stock feeds are tested to ensure that they do not contain prohibited weed seeds. The laboratory also conducted forensic seed identifications for the police.

WEEDS

Advisory

Wild oats. A survey of farmers in northern NSW showed that yield losses due to wild oats cost \$3.6 million annually despite extensive use of rotations, herbicides and other control measures.

Research officers at the Agricultural Research Centre, Tamworth, developed a computer model to predict yield losses from wild oats in the field and have tested it against actual yield losses in farmers' paddocks. Information derived from the model was used to formulate a tabular guide that will help farmers and advisers make economically sound decisions about herbicide use.

The tabular guide entitled 'Using herbicides to control wild oats in crops' has been included in the booklet *Weed control*

in winter crops 1986 and distributed to departmental offices throughout the State.

Blackberry. In 1984 an exotic strain of rust (*Phragmidium violaceum*) was found on blackberries in south-eastern Victoria. The rust is now widespread on the South Coast and has been found in isolated areas of the Northern and Southern Tablelands. The rust is suspected of being illegally released. The Department is cooperating in the monitoring and possible integration of biological control into current control programs. There are about five million hectares of land infested with blackberry in NSW, resulting in agricultural production loss of \$17–20 million annually.

Parthenium weed. The parthenium weed awareness campaign has been successful in training the public to identify parthenium weed. A weed identification competition held at the Agquip field days at Gunnedah showed that, although few people have seen parthenium growing in the field, it was as readily identified as the best known local weeds.

Weed control officers from Moree Plains and Narrabri Shires and the Far North Western Slopes County Council are maintaining an intensive surveillance for parthenium weed. Plants found are destroyed and the surrounding area spot treated with residual herbicide. One plant has been found as far south as Hillston.

Inspection of harvesting machinery crossing the border from Queensland into NSW moved into its second season of operation. Over 500 units were inspected, of which 94 required additional cleaning. There were two successful prosecutions under the legislation. A special header washdown and cleaning facility was opened at the Goondiwindi–Boggabilla crossing.

The gall-forming moth, *Epiblema strenuana*, shows promise as a useful biological control agent on parthenium weed in Queensland. This moth also attacks Noogoora burr and was released on this weed at sites in Narrabri and Moree Plains Shires.

Parramatta grass. Public concern over the Parramatta grass problem on the North Coast was clearly demonstrated when a meeting of landholders convened by Bellingen Shire Council attracted over 300 participants. Subsequent meetings and field

days at various localities have also been well attended and local landowners have been informed of the current status and available control measures for Parramatta grass. Experiments on large-area management strategies, herbicide rates, timing and selectivity in pastures are being undertaken.

Spray methods. As a result of legislative constraints on the use of 2,4,5-T, coupled with the release of several new herbicides and the need to investigate innovative application methods, a major research project started on chemical control of woody shrubs. Savings in labour and chemical costs are possible and reductions in off-target drift can be achieved through the use of suitable low-volume application techniques such as a gas-gun.

In order to accurately compare the costs of different herbicides and application methods, a technique of recording application rates on woody shrubs has been developed. When 15 experienced spray operators were compared by this technique, application rates varied from two-and-a-half to five times the required amount, identifying a significant source of variability in experimental and commercial results.

Goats. An advisory program on the use of goats to control woody shrubs such as blackberry and briar was undertaken.

Research

Screening for herbicidal efficacy against a range of troublesome weeds in field crops was conducted by the Weed Research and Demonstration Units located at Orange and Glen Innes. Work was conducted in winter cereal crops, lupins, pigeon pea, soybeans, chickpea, pasture seed and lucerne for the control of a range of important weeds.

Annual phalaris. Particular effort was devoted to annual phalaris (*Phalaris paradoxa*), which has become a major weed of winter cereals within the last five years. Annual phalaris now infests 14% of the State's winter cereal crop. Eight experiments were conducted that enabled development of control recommendations and helped in registration of appropriate chemical controls.

Cultivar tolerance. Screening of cereal cultivars for herbicide tolerance was conducted at Wagga Wagga for the fifth successive

season. Nineteen wheat varieties and 18 barley varieties were treated with a range of pre and postemergence herbicides at the recommended and three times the recommended rate. Many differences in varietal tolerance to herbicides were noted and have been incorporated into the advisory booklet *Weed control in winter crops 1986*.

Large seasonal differences in the reactions of varieties to herbicides have been observed. As a result, a project was started to examine the effects of various environmental factors on the performance of herbicides.

Aerial seeding. In aerially seeded rice, a new sulfonyl urea herbicide was extensively tested and found to give satisfactory control of the two major weeds, starfruit (*Damasonium minus*) and dirty dora (*Cyperus difformis*); the chemical also showed acceptable crop safety. If further testing confirms early results, this herbicide should replace MCPA, the currently used herbicide. MCPA gives poor yield response, may damage the rice crop and possesses a drift hazard to neighbouring broadleaf crops.

In combine-seeded rice, a range of residual herbicides was tested in an experimental irrigation regime that gives economies in water use, but is commercially unacceptable due to increased weed pressure from barnyard grass. None of the treatments gave commercially acceptable weed control; however, crop yields from the best treatments were satisfactory.

African lovegrass. Interspecific competition between African lovegrass *Eragrostis curvula* cv. Consol, the local weedy *Eragrostis curvula* (tall green) type, and various pasture grasses at different ratios in a replacement series is being tested at Glen Innes. As well, a program for controlling African lovegrass in native and improved pastures started.

Poa tussock. The control of *Poa tussock* (*Poa labillardieri*) has been treated similarly to African lovegrass and investigations on the Central and Southern Tablelands have led to sound programs for control of this native highlands grass

Nodding thistle. Herbicide experiments on the Southern and Northern Tablelands have identified MCPA as the most cost-effective chemical for nodding thistle control, being both cheaper and more effective than the conventional 2,4-D treatment.

True scotch (*Onopordum acanthium*) and other *Onopordum* species thistles are proving more difficult to control chemically, and experiments are continuing to evaluate herbicidal treatments. Initial trials show the necessity of an integrated approach for control using herbicides, perennial improved pastures and livestock management.

Biological control

The Department is involved in six biological control programs for weeds.

A mass rearing program is underway for noxious cacti such as tiger pear (*Opuntia aurantiaca*) to provide insects for field distribution into areas where natural increase is not satisfactory.

Two Orange-based biological control programs are investigating the use of native rather than introduced microorganisms as biological control agents. This technique is known as inundative biological control and involves the application of specially formulated microbial spore suspensions in the same manner as chemical herbicides. Work to date has included the selection and biological investigation of *Colleotrichum xanthii* for control of Bathurst burr (*Xanthium spinosum*).

The other three programs involve the release on the North Coast and monitoring of biological control agents introduced by the Queensland Department of Lands and CSIRO. These programs include the release of a gall-forming moth (*Epiblema strenuana*) on annual ragweed and Noogoora burr, the release of a gall fly (*Rhopalmyia californica*) on groundsel bush and the release of a flea beetle (*Cyrtobagous salvinae*) on salvinia. The ragweed moths have established well and are spreading rapidly, while the salvinia flea beetles, which established at most sites, are spreading slowly. Groundsel bush gall fly is now distributed throughout infestations in the region. Monitoring of initial release sites has indicated variable results from complete plant death to minor reductions in flowering or failure to establish.

PRICKLY-PEAR DESTRUCTION COMMISSION*

The Prickly-Pear Destruction Commission is a statutory authority established under the Prickly Pear Act, 1924, as amended.

The objective of the Commission is to control, or eradicate whenever possible and economically practical, pest cacti (prickly-pear) in NSW. The Commission continued to pursue this objective in 1985-86 by using and recommending an integrated control approach with emphasis on biological control. Supply and distribution of the prickly-pear insects *Cactoblastis* (*Cactoblastis cactorum*) and cochineal (*Dactylopius austrinus*, *Dactylopius ceylonicus* and *Dactylopius opuntiae*), and the supply and use of environmentally safe chemicals, cultivation and other mechanical methods, and a constant surveillance program, were the methods employed to attain the objective.

The Commission continued to supply a chemical, Prickly-Pear Spray, at cost price. The chemical was provided at half cost when purchased to control tiger pear (*Opuntia aurantiaca*). Field workers were employed to control prickly-pear on vacant crown land. Some contract work was carried out for private landholders, government departments and other instrumentalities.

The Commission's biological research program continued, directed mainly at

achieving selective control of harrisia cactus (*Harrisia martinii*), tiger pear and common pest pear (*Opuntia stricta* varieties) in unfavourable climatic environments. Some encouraging results were obtained near Bogabilla, close to the Queensland-NSW border, with a mealybug insect that attacks harrisia cactus. This trial began in December 1984 and the insect will probably be helpful in preventing harrisia cactus becoming a major pest in NSW.

The Commission almost completed a program designed to record all property information, infestation records and statistics on computer during the year. The final stage of the program will be implemented in January 1987, when a computer-controlled reinspection system will begin operation. The reinspection program will help the Commission to further rationalise surveillance inspection work, particularly in areas where opinions have been expressed that some species of pest cacti are now ecologically in balance with the environment.

* The Annual Report of the Prickly-Pear Destruction Commission is issued separately.

PLANT QUARANTINE AND EXPORT SERVICES

COMMONWEALTH FUNCTIONS

The Department is agent for the Commonwealth Department of Primary Industry for the administration of agricultural quarantine under the *Quarantine Act* and for the export of grain, field crops, fruit and vegetables under the *Export Control Act*. Agricultural inspectors conduct the inspections under these Acts and 10 State Acts, the principal ones being the Plant Diseases Act, Horticultural Stock and Nurseries Act, and the Seeds Act.

Agricultural quarantine

The importation of all goods including plant, machinery and cars, and passengers travelling by sea and air are subject to surveillance for agricultural quarantine purposes.

Passenger clearance by air. A total of 9639 civilian and 306 military flights were serviced, 1719 more than last year. A total of 1 715 377 passengers and crew were cleared, with 29 193 quarantine seizures.

Passenger clearance by sea. A total of 73 passenger and naval vessels were cleared, with 852 quarantine seizures.

Parcel post. Parcel clearance was transferred from Redfern to Clyde, with improved facilities for inspection. A total of 30 500 parcels were inspected and 3639 required attention for agricultural quarantine.

Containerised cargo. The number of vessels discharging containerised cargo increased from 810 in 1984-85 to 905 in 1985-86 with the number of containers discharged increasing from 195 567 to 204 950. A total of 83 121 containers were subject to quarantine impediments and 4832 were fumigated before release. Follow-up inspections were conducted on 1292 of the 121 830 granted immediate delivery and quarantine infringements were detected with 12.

Insects and related organisms intercepted. A total of 1542 insect interceptions were submitted for identification. Some of the

interceptions of note were:

- khapra beetle (*Trogoderma granarium*) on two occasions in lentils from Thailand
- warehouse beetle (*Trogoderma variabile*) on two occasions in asparagus seed imported by air from the USA, and once in baggage from Lebanon
- an increase in interceptions of woodwasps (Siricidae) including four interceptions of *Sirex juvencus*
- giant African snail (*Achatina fulica*) on the outside of containers from PNG on three occasions and on one occasion a live snail was found in a collection of shells
- Pacific dampwood termite (*Zootermopsis angusticollis*) was detected in Douglas fir from the USA on three occasions
- fruit fly (*Dacus passiflorae*) in bell fruit imported from Fiji by air.

Nursery stock. A total of 487 consignments of nursery stock were received and processed for postentry quarantine. The consignments comprised 49 056 orchids, 2632 bromeliads, 1357 cacti, 3821 ornamentals, 7170 bulbs, 5063 rose eyes, 242 food, fibre and energy crops, and 6051 tissue culture flasks. This was an 18% increase over last year.

Timber. The total amount of timber imported was 564 547 cubic metres. Of this, 16 924 cubic metres was fumigated because of insects.

The vessel *Hoelien* sank off the NSW coast and lost about 600 tonnes of timber. An armada of small craft took bundles of timber in tow and brought them into ports along 160 km of coastline. Despite the difficulties, quarantine inspections were undertaken.

New quarantine facilities—Australian Winter Cereals Collection, Tamworth

Following a survey of postentry quarantine facilities at the Australian Winter Cereals Collection at Tamworth, arrangements were made for the provision of an additional glasshouse and for major renovations to be carried out on an existing glasshouse. These glasshouses are used for the postentry growing of wheat, oats and barley. The new facilities have provided up to 80% additional growing space to cater for increasing numbers of seed introductions.

Postentry quarantine glasshouses

A review of all registered postentry quarantine glasshouses was carried out to ensure that all premises complied with the basic requirements of the Commonwealth Department of Primary Industry. The owners of two screenhouses were required to rescreen their buildings and resubmit for inspection, while the owners of three glasshouses decided to stop importing and allow their registrations to lapse.

Promotion of agricultural quarantine

Agricultural quarantine exhibits were held at the Sydney Royal Easter Show, Sydney Garden Fair and the Orange Field Day to answer inquiries and increase quarantine awareness.

A further initiative to increase quarantine awareness amongst overseas travellers has started with the appointment of two female liaison officers. Following training, these officers have undertaken duties at the embarking passenger areas at Kingsford Smith international airport and the overseas passenger terminal at Circular Quay. The objective is to encourage passengers to think of Australia's quarantine restrictions when making overseas purchases and to declare all quarantinable items for inspection on return.

Administration

A total of 61 245 import permits were issued and total revenue of \$2,442,102 raised for quarantine services. There was a total of 177 prosecutions involving agricultural products and \$40,550 in fines were imposed.

Relocation of Export and Import Branch

The redevelopment of Darling Harbour has led to the loss of the Export and Import (E&I) building. The Branch was first established in the Mining Museum in 1889 and then moved to Darling Harbour in 1905. The first building was destroyed by fire in 1956. The Branch was relocated in the Remington Centre, Liverpool Street, Sydney, in June 1986.

National review of qualifications and training of the Australian Quarantine Service

The Director of Plant Regulatory Services undertook a national review on the qualifications and training of the Australian Quarantine Service on behalf of the Commonwealth

Department of Primary Industry. The report recommends minimum qualifications for inspectors and a program to provide uniform training in all States.

Exports

Grain. New orders prescribed for grain, plants and plant products under the *Export Control Act* have resulted in improved inspection facilities being installed at major bulk grain terminals.

Automatic sampling equipment has been provided at the Grain Handling Authority terminals at Sydney and Newcastle. This should lead to more efficient and safer inspection.

Bulk grain exports for 1985-86 were similar to shipments for 1984-85 and are listed below:

Bulk grain exports for 1985-86

Grain	1985-86	
	Passed (tonnes)	Rejected (tonnes)
Wheat	4 480 043	2 143
Barley	82 968	-
Sorghum	21 941	-
Sunflower	12 600	2 650
Rapeseed	13 773	-

A total of 153 bulk ships were surveyed before loading grain and of these, 15 required treatment and reinspection.

Field crops. An export market developed for baled lucerne hay to Japan. Thirty-five '40 foot' containers were loaded at Forbes and at centres along the Murray River. Lucerne growers expect an expanding market.

One thousand six hundred and ninety-five shipping containers of cotton and cotton seed were exported from the Namoi region.

Fruit and vegetables. Exporters maintained their share of most markets and developed some new outlets. After complying with strict quarantine requirements, a successful entry was made onto the Taiwanese market of three containers of kiwifruit, two of grapes and one of plums.

The Closer Economic Relations (CER) agreement with New Zealand opened up that market for other importers, but quarantine constraints have created difficulties with some products. New Zealand fumigated most fresh grape consignments from Australia for miscellaneous insect contamination.

Grape exports were particularly successful and well received on South-East Asian markets. Despite high costs and lengthy shipping times, Thompson Seedless grapes were successfully marketed in Europe.

The export of rockmelons and honeydews to Hong Kong continued strongly and further expansion of this market can be anticipated.

Action on packages of fruit and vegetables exported

Crop	Inspected	Rejected
Apples	96 996	4 289
Pears	53 197	1 947
Citrus	149 352	8 543
Grapes	215 923	5 332
Stone fruits	176 411	3 584
Strawberries	10 955	2 252
Pineapples	3 761	219
Mangoes	41 885	4 231
Rockmelons	143 789	1 771
Tomatoes	97 696	1 103
Other fruit	85 393	1 340
Potatoes	29 269	290
Onions	39 072	2 148
Other vegetables	500 563	6 251

STATE FUNCTIONS

Plant Diseases Act

Powers under the Act were used throughout the State to prevent the spread of pests and disease and to maintain standards in the marketing of fruit and vegetables.

Regulatory action involved the issuing of one thousand and eighty notices and undertaking seven prosecutions.

Packages detained at markets for non-compliance

Inspections	Packages	Bulk bins
Apples	29 835	36
Pears	10 231	35
Oranges	6 833	35
Lemons	737	-
Grapefruit	1 460	-
Mandarins	5 949	-
Grapes	5 018	-
Rockmelons	3 866	10
Bananas	22 088	-
Tomatoes	14 945	-
Mangoes	2 473	-
Potatoes	53 787	-
Onions	4 679	-
Other	8 152	-
TOTAL	170 053	116



The NSW Plant Quarantine Station is located at the Biological and Chemical Research Institute, Rydalmere. Departmental officers inspect quarantined plants and carry out tests to ensure that introductions are free of pests and diseases. Allan Chambers, Quarantine Horticulturist, tends plants in the quarantine glasshouse.

District inspections by agricultural inspectors

Orchards, etc.	8 792
Fruit shops	4 041
Grain storages	420
Nurseries	2 642
Resellers	2 659
Home gardens	18 683

Major pest control programs

The prevention and control of plant pests and diseases is a major function under the Plant Diseases Act.

Fruit fly. The quarantine areas of the Murrumbidgee and Murray Irrigation Areas remained free of fruit fly (*Daucus tryoni*). This was achieved despite favourable weather conditions and the pressure from a large fruit fly population that developed in coastal NSW. This success can be attributed to the active participation of the Department in whole-town baiting treatments throughout the region. A media program in support of the baiting improved public awareness and reduced complaints about spraying.

Warehouse beetle. In 1982 an intensive inspection and control program was jointly funded by the Commonwealth and States, and the population of warehouse beetle (*Trogoderma variable*) was substantially reduced. Since then, the centres of infestation, Griffith and Gunnedah, have been under regular surveillance by inspectors. A heavy infestation of warehouse beetle was detected this year in rice hulls that had been used as insulation in an office block in Griffith. New infestations were detected in outlying rice storages at five centres.

Citrus leaf miner. This pest (*Phyllocnistis citrella*) rapidly spread down the NSW coast to Wyong in early 1970 and appeared to reach a climatic limit. However, in the past year light infestations have occurred in the Sydney metropolitan area and as far south as Wollongong.

Argentine ant eradication. A successful court action by Lane Cove West residents effectively prevented the Argentine Ant Eradication Committee from functioning in its role to control Argentine ants (*Iridomyrmex humilis*) in NSW. The Committee, which comprised representatives from the Department of Local Government, health surveyors, local government representatives

and a nominee of the Minister for Agriculture and Fisheries, has been disbanded and the Act repealed.

As Argentine ant has been declared a pest under the Plant Diseases Act, the responsibility for directing control of this pest now rests with agricultural inspectors of this Department.

At present there are six known infested areas in NSW, being about 40 ha in the Lane Cove National Park and adjacent areas, 10 ha at Auburn and three small infested areas near Kiama.

European wasp. In 1984–85 the Department conducted a campaign to increase community involvement in the control of European wasp (*Vespula germanica*), as over 300 nests had been destroyed by the Department that year. The Department undertook to maintain a small inspection unit to destroy nests in emergency situations. The unit conducted field demonstrations with five Sydney councils on identification of the wasp, tracking and location of nests, and on treatment and safety precautions.

Although local councils and pest control operators treated about 80 nests during the year, the Department's unit made 564 inspections and located and treated 282 nests. The unit reported 98 people stung by the wasp, with 13 requiring medical treatment and three being hospitalised.

Bunchy top of bananas. The incidence of bunchy top virus disease remained similar to last year with 1472 infections detected in 1984–85 and 1402 in 1985–86. The level would have been lower, but for 280 infected plants detected on one plantation in the Richmond area.

ANIMAL INDUSTRIES

Extensive animal industries

Intensive animal industries

Animal health services

EXTENSIVE ANIMAL INDUSTRIES

IMPROVED MARKETING METHODS FOR SHEEP AND CATTLE

This program has two aims: to improve the skills of market participants in the appraisal and marketing of sheep and cattle; and to help in the introduction of electronic technology for sale of stock by description.

The need to improve the operational and pricing efficiency of selling systems for sheep and cattle led to the Department becoming involved in the introduction of carcase classification and objective sale-by-description methods. The ability to assess the carcase weight and fatness of live animals is an essential skill for producers and agents wishing to participate in these new selling systems. Courses in livestock appraisal have been conducted by the Department since 1981.

A coordinated advisory program, 'Improved marketing methods for sheep and cattle', has, with modifications, been in progress since 1983-1984. It covers the running of livestock appraisal courses and advisory work associated with new selling systems. A third component, covering transport and handling, was introduced in 1985-1986.

The emphasis in livestock appraisal has changed to refresher courses and courses to accredit assessors for Computer-Aided Livestock Marketing (CALM). CALM is the national 'electronic saleyard' due to be launched in the second half of 1986.

Highlights of a program to improve marketing methods for sheep and cattle were:

- Nine livestock appraisal courses were held for about 130 participants, mostly agents. The courses were conducted in conjunction with either CALM and/or the NSW Stock and Station Agents Association.
- Sixteen livestock appraisal field days were held with 550 producers attending.
- A display and assessment competition was organised for the Royal Agricultural Society's Sydney steer show. Producers, agents and meat industry representatives

had the opportunity to test their stock assessment skills.

- A new assessment manual for CALM was prepared.
- Officers were involved with CALM working parties with major input into stock description and assessor training.
- Trials and planning were undertaken for computer and video-aided sales of store stock. This is a new and important extension of the initial slaughter stock work and has involved close liaison with CALM and Elders IXL Pty Ltd.

DAIRYING

Marketing arrangements

The Department had a major input into negotiations on changes to the national dairy industry marketing arrangements. A clause in the new legislation that virtually preserves each State's liquid milk markets for its own farmers helped finalise these arrangements. New South Wales dairy farmers will pay a levy of up to two cents a litre on all liquid milk to support export losses on manufactured milk products.

Dairy herd improvement

Following two extensive reviews on the conduct and operation of the State's dairy herd improvement program the Department:

- formed a Herd Improvement Policy Committee comprising representatives from industry, the Department and the Dairy Corporation
- formed a Herd Improvement Management Committee responsible for implementing decisions of the Policy Committee
- changed the management structure at Graham Park Artificial Stock Breeding Centre to improve its marketing operations.

The number of farms and cows being herd recorded continued to rise as a result of the Department's increased effort in promot-

Number of herds and cows recorded for the dairy herd improvement program

	1982	%	1984	%	1985	%
Herds recorded	866	27	965	33	1 002	35
Cows recorded	74 584	27	85 278	32	88 694	33



One of the Department's objectives is to ensure that there is an appropriate level of skills and knowledge training in agriculture. At Bega, departmental officers and local breeders demonstrate cattle judging to school students.

ing the dairy herd improvement program.

The following table shows the increase in herd-recorded cattle bred by artificial breeding (AB) in 1982, 1984 and 1985.

Increases in herd-recorded cattle bred by artificial breeding

	1982 (%)	1984 (%)	1985 (%)
2 year-old	34	42	45
3 year-old	34	37	43
4 year-old	30	36	37
Mature	20	31	34
All ages	26	34	38

As well as the above increases, 52% (11 310) of heifer calves in the herd recording 'calf register' in 1984-85 were bred by AB.

Herd-recorded cattle produce about 1000 L more milk per head per year than non-recorded cattle, and AB cattle produce about 400 L more per head per year than naturally bred cattle.

Mastitis control

Mastitis advisory program. The Department continued to provide dairy farmers with a monthly bulk milk cell count from the Central Veterinary Laboratory, Glenfield. The dairy industry saved about \$6 million last year through lower mastitis levels.

To encourage mastitis control, the Department, in conjunction with Beechams Veterinary Products, awarded badges to farmers whose herd bulk milk cell count averaged less than 100 000 cells per mL. The '100 club' provides an incentive to farmers to reduce cell counts.

In 1985-86 the State winner of the Bulk Milk Cell Competition was K.R. Whatman of Kangaloon, near Bowral, with a count of 54 000. Nine farms averaged under 100 000. The State bulk cell count is now averaging 400 000 cells per mL, down from 800 000 cells 10 years ago and 600 000 five years ago.

The Department surveyed dairy farms to study the effects of teat disinfection and treatment with a long-acting antibiotic at the end of lactation, and to determine how many farmers adopt these practices. Farms adopting both practices gave the lowest cell counts. Over half the farmers surveyed disin-

fected cow teats after milking. However, only 20% treated all their cows at the end of lactation.

Milk yield and composition

Genetic variants have been found and identified in all major milk proteins. As the composition of milk protein has considerable influence on the manufacture of milk products, the information may help in selecting superior bulls to be used for artificial insemination.

Dairy Herd Improvement Program (DHIP)

A benefit-cost study indicated the genetic improvement component of the DHIP is highly profitable and capable of returning almost \$3 million a year to the industry, with a benefit:cost ratio approaching 5:1. Research projects have been designed to ensure the DHIP is continually refined to optimise these gains for the industry.

BEEF

'Beef-n-omics'

The 'Beef-n-omics' program is aimed at improving the competitiveness and profitability of beef cattle enterprises. It encourages beef producers to assess their existing resources and adopt improved management programs to improve production.

Thirty Beef-n-omics workshops have been completed with an attendance of 300 beef producers. Another 200 producers are enrolled for future workshops.

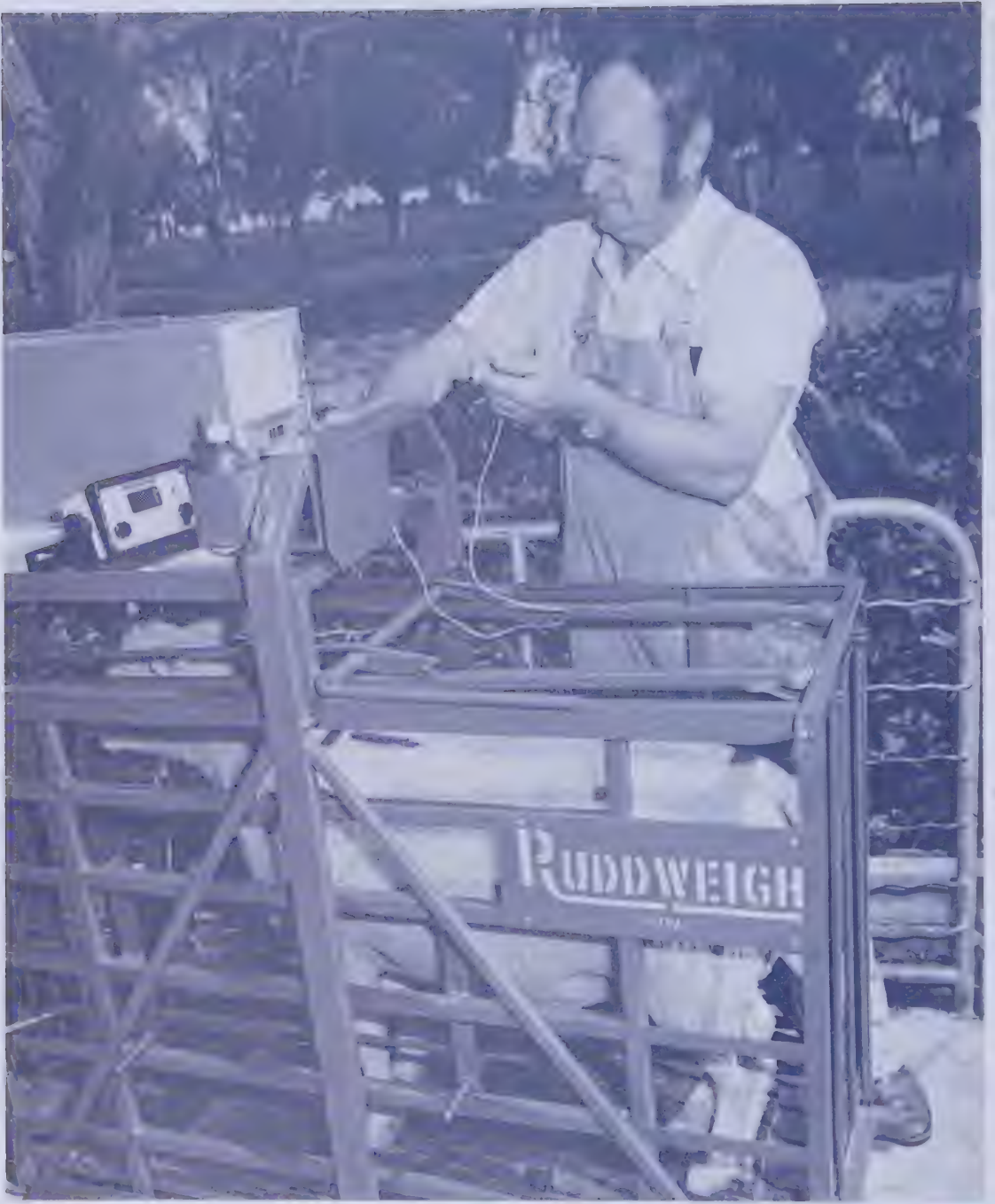
The program involves a coordinated state-wide series of two-day workshops. Follow-up activities include field days, practical instruction days, bus tours to inspect alternative breeding projects and visits to successful beef properties to learn management techniques. At most workshops, producers have requested a review day in 12 months time to discuss and assess the changes they have made to their management as a result of the Beef-n-omics workshop.

An important component of the program has been the development of a 'user friendly' computer model. The model has generated great interest among other State departments of agriculture and teaching institutions.

The Beef-n-omics model can be used to examine the relative profitability of recommended management practices. It was used to evaluate different joining strategies including crossbreeding and the long-term profitability of



Semen container being prepared by Stewart Brandon, Laboratory Attendant, for transport with liquid nitrogen at Graham Park Artificial Stock Breeding Centre Operated by the Department. Graham Park is an integral part of the State's Dairy Herd Improvement Program, which aims to provide dairy farmers with a team of genetically superior sires proven for improved production and functional type.



Innovations in ultrasonic fat-depth measuring equipment, automated weighing scales and sophisticated computer programs enable the Department's Meatsheep Testing Service to help NSW prime-lamb producers breed faster growing, leaner lambs. Alan Luff, Officer-in-Charge of the Meatsheep Testing Service, measures fat depth and liveweight to determine likely carcase composition.

bility of performance recording in beef herds.

An additional benefit from the program has been the hands-on computer experience gained by all officers involved with the program.

Breedplan

Breedplan is a system for within-herd genetic evaluation of beef cattle. It uses information on an individual animal and its relatives to calculate estimates of genetic merit; that is, levels of production that can be passed on to progeny. It was introduced in March 1985 and resulted in a threefold increase in the rate of performance recording with 264 herds now enrolled. Breedplan is a breakthrough for performance recording and has led to the development of 'Group Breedplan', which is undergoing trials before release to industry.

Group Breedplan is the first system of its kind in the world providing across-herd genetic evaluation. It will show how genetic trends for individual herds rank for different traits relative to the group or breed average and will provide producers with an accurate guide in the selection of sires and replacement animals.

Crossbreeding

A beef cattle crossbreeding project is comparing pre and postweaning performance of various Hereford by Brahman crosses. Ultimately the information obtained will determine the most appropriate crossbred system for beef production in different environments. Preliminary results indicate that:

- crossbred cows weaned heavier calves than purebred cows
- first-cross steers were heaviest at 30 months of age due to a combination of a higher weight at weaning and a faster postweaning growth rate
- backcross steers and purebred steers had similar postweaning growth rates, indicating that the substantial hybrid vigour for postweaning growth rate in the first cross (about 45%) may be lost in backcross steers.

Growth rate

The overall productivity efficiency of three lines of Angus cattle is being compared. One line has been selected for increased growth rate, another line for decreased growth rate, while the remaining line remains unselected.

In conjunction with this experiment, a computer-controlled feeding system has been established for the automatic recording of feed intake of individual animals in a feedlot.

For producers selecting their cattle on growth rate this research will show the effect of growth on reproduction, feed efficiency, carcass acceptability and total herd productivity.

Feeds Evaluation Service

The Department's Feeds Evaluation Service at Glenfield analysed 2283 samples during the year. Of these, 281 were grains, 396 roughages, 700 pasture or forage crop and 312 mixed feed samples. The remainder were by-products, silage and miscellaneous feeds. The Service continued on the basis of only accepting samples submitted on behalf of producers by departmental staff.

The purchase of automated laboratory equipment during the year has considerably increased the speed of sample processing.

SHEEP

Genetic improvement

The Department has a number of programs on genetic improvement in the sheep industry. These programs work towards the application of sound genetic principles and the incorporation of objective measurement in practical sheep breeding programs.

The Department's Fleece Measurement Service and Meatsheep Testing Service support the genetic improvement programs in wool and meatsheep. During 1985-86, 55 440 samples from 236 properties were tested by the Fleece Measurement Service and 18 200 sheep were measured by the Meatsheep Testing Service.

The programs have been extremely successful with almost 50% of both Merino and meatsheep rams sold in NSW being tested.

In 1985-86 NSW Merino studs held 44 on-property production sales of rams tested through the Fleece Measurement Service. Similarly, 18 meatsheep studs held auctions based on Meatsheep Testing Service results.

Production measurements from these services are also provided in catalogues at major ram auction sales throughout the State. Buyers consistently pay higher prices for objectively measured above-average rams.

Production competitions

The Department is involved in over 40 sheep production competitions that use measurement services. A comprehensive set of guidelines has been drawn up and a computer program developed to calculate, analyse and present the results. The competitions and guidelines are used to provide sheep producers with direction in improving the performance of their flocks and are an ideal venue for exchange of information and new technology. They also demonstrate the relevance and practical use of objective measurements in sheep breeding. These initiatives are strongly supported by industry.

Group activities

In carrying out the aims of the genetic improvement programs the Department was involved in 130 group activities and had direct contact with over 18 000 sheep producers and ram breeders.

Wool quality

The Department conducted a major advisory program on the importance of length and strength measurements for wool. These measurements are important if wool is to remain competitive in the textile market, and are a further step in the development of wool sale by description.

The program stressed the importance and implications of the new measurements, encouraged pre-sale testing of wool for length and strength, and emphasised the importance of proper clip preparation, particularly the avoidance of contamination.

A series of large meetings of producers were held to create awareness, followed by 80 smaller workshops to improve education. More than 5000 wool producers attended the functions. Already, 12% of combing wool sold in NSW is being pre-sale tested for length and strength—a higher adoption rate than the average for Australia. Much of the success of the program was due to cooperation between the Department, the Australian Wool Corporation and wool-selling brokers.

Investigation and monitoring are underway to look at management implications of the new length and strength measurements.

The emphasis on correct clip preparation coincides with the development of a national 'Code of practice for preparation of the Australian woolclip'. Many industry bodies, both private and public, and including the

NSW Department of Agriculture, are helping to prepare the code.

Simulation models

Changing technology has increased the demand for simulation models (or computerised management packages) to enable advisory officers to better predict the physical and financial implications of their recommendations to farmers. Increased cost-price pressures mean higher levels of farm management for survival. Simulation models are a valuable tool in assessing management options in more detail than previously available. The Department is helping develop a number of simulation models:

- 'Sheepo' is a computer program developed by the Victorian Department of Agriculture and Rural Affairs. The model can predict changes in available feed, sheep production and profits in response to different lambing percentages, and management and marketing strategies. The NSW Department is adapting the program for use in NSW.
- A modified version of 'Drought pack' has been developed. This program allows advisers, with their producer clients, to quickly assess various drought strategies. A user-friendly model called 'Feed' has also been developed, which allows the formulation of drought and production rations for sheep and cattle.
- Cooperation continued with CSIRO in the development of a high technology model known as 'Grazplan' for use by advisory officers. This model will be used to develop broad recommendations for farmers in distinct geographical areas. Subcomponents of this model will be released by CSIRO and the Department in 1986.

Short courses for producers

A course in Merino breeding principles was held at Murrumbidgee College of Agriculture for 24 young representatives from NSW Merino studs—Australia's future studmasters. A follow-up school was requested.

Real-time ultrasound

Departmental officers have adapted real-time ultrasound imaging technology to the diagnosis of foetal number in sheep. It is now commonly used in research projects involving breeding flocks. As a further development, training exercises throughout Australia

have resulted in each State now having competent operators applying this sophisticated technology to commercial sheep production.

Selection and breeding of Merinos

Large variations in net reproduction rate (particularly lamb survival and ewe fertility) occur between Merino strains, and between bloodlines within strains. Selection between flocks might enable commercial Merino producers to quickly improve the reproductive performance of their flocks.

Flocks of Merinos selected solely for either hogget clean fleece weight or weaning liveweight and a control flock are maintained at Trangie Agricultural Research Centre. These flocks are being monitored for long-term responses to, and the effects of, selection for fleece weight or liveweight on other commercially important characteristics in Merino sheep.

The effects of crossbreeding Merino strains on various production characters is being studied. Eight Merino lines are being used, comprising two fine-wool strains, five medium strains and one strong-wool strain. Preliminary results show that crossbred strains have higher lamb survival, birth weight and greasy fleece weight than their parents. The crossbred strains also tend to have increased weaning weight, nine-month liveweight and resistance to fleece rot.

Fleece rot and body strike

The inheritance of resistance to fleece rot and blowfly strike in Merino sheep is being investigated. This study is comparing a range of bloodlines representative of the Australian Merino industry. The incidence of fleece rot and fly strike is being monitored in both pureline and crossbred progeny. It is expected that the results will show how accurately fleece rot and body strike can be predicted in progeny from the levels occurring in their parents and the value of crossing strains of Merinos known to be susceptible to fleece rot with more resistant strains.

Wool characteristics

Variations in the physical characteristics of wool may have significance in processing.

The relationships between the protein composition of Merino wool, the physical properties of the fibres and the properties of fabrics manufactured from these wools are

being studied. In particular, the effect of different levels of two amino acids (cystine and tyrosine) are being examined, as they may be related to resistance to bulk compression and mean fibre diameter. Both characteristics are of extreme importance in the manufacture of high quality wool products.

Carcase fatness

Investigations are being carried out into the factors influencing fatness levels in sheep. Altering the protein level in the diet is ineffective in reducing carcass fatness in lambs slaughtered at heavier-than-average carcass weight (17 kg). Significant commercial reductions in fat levels are obtained by leaving male lambs entire. This effect is most noticeable at the heavier carcass weights, where overfatness is most evident. The growth of ram lambs will only be superior to wethers when the quality and quantity of feed allows them to consume more feed, which is used more efficiently.

Reproductive efficiency

A highly fertile strain of sheep for prime lamb production is being developed. The strain, known as the 'Hyfer' line, is being bred for year-round joining potential with the eventual aim of each ewe rearing two lambs every eight months.

Increasing the frequency of lambings offers the greatest potential to improve annual lambing percentages and overall flock efficiency. It requires careful management, and economically viable strategies are being investigated to maximise litter size, lambing frequency and lamb survival.

GOATS

Research and advisory programs to service the increased number of goats in the State have been highly effective.

Information from the most comprehensive census so far taken of the goat industry shows that NSW had over 50% of the Australian goat population as at 31 March 1985. There has been an average annual growth rate of about 32% over the last six years in NSW, compared with the Australian rate of about 22%.

The goat research program at Wollongbar has provided estimates of heritabilities for economically important characters in cash-

mere goats. These values can be used to develop breeding programs for the upgrading of feral goats and are the first estimates published in the world for down-bearing (cashmere) type goats.

Dairy goats

The Department has greatly increased the level of advice given to dairy goat producers. A series of field days were held throughout NSW in an attempt to increase the standard of management. Special emphasis was placed on increased hygiene and milk quality.

A Goat Industry Milk Marketing Association was formed, representing producers, distributors, manufacturers and retailers. It will coordinate marketing activities, with the ultimate aim of making the industry self-regulating.

Mastitis and milk quality. In conjunction with the Goats' Milk Producers' Association, veterinary staff developed a program to help investigate and control mastitis. The pro-

gram included advisory material on mastitis for goat milk suppliers.

Departmental staff are developing an advisory code of practice for hygienic handling of goats' milk. This document will provide industry with guidelines for producing a high quality commercial product.

DEER FARMING

Deer farming continued its rapid growth over the past twelve months, with the number of deer farms in NSW now estimated to be 200. Demand for breeding stock is high and prices have increased to at least \$800 for fallow breeding does.

Early this year the livestock officer responsible for deer farming advice undertook a study tour of the New Zealand deer farming industry.

Agreement was reached with industry on guidelines for welfare for the deer farming industry.

Australian goat production by State shows that NSW has over 50% of the national herd.



Venison

The Department's Primary Products Promotion Unit provided help to the industry to promote venison.

In February 1986 Australia's first deer-only abattoir opened at Muswellbrook. This should encourage market innovation and has already led to the introduction of venison to selected supermarkets.

Demand for venison increased with imports worth over \$500,000 from New Zealand in the last twelve months to meet local demand. This is an 80% increase in imports over the preceding two years.

After revisions to quarantine requirements, the first imports of live deer since 1885 arrived in Australia in December 1985 from New Zealand. Thirty-six head of Wapiti and red deer, valued at \$70,000, are now being used in herds in NSW and Victoria.

LIVESTOCK REGULATORY SERVICES

Wild dog review

A review of wild dog control in eastern NSW started in 1984 and the Review Committee presented its Report to the Minister in early 1986.

A major recommendation was to abolish Wild Dog Control Boards. This did not reflect on the commendable voluntary efforts of Board members; however, many of the Boards' activities were duplicated by Pastures Protection Boards. The administration of wild dog control is now vested with Pastures Protection Boards.

A second important recommendation was to use helicopters for bait placement in eastern NSW. Helicopters have a number of advantages over fixed-wing aircraft for bait distribution. They can accurately place small amounts of bait in areas where wild dogs are active. This is more efficient, reduces the risk to non-target species and uses less bait.

Feral animals

Feral pigs. Two significant projects were undertaken during the year. One investigated ways of improving the effectiveness of feral pig control with the poison 1080, while reducing the hazard to non-target animals. Another compared alternative toxins with 1080. Both were field studies aimed at improving the efficiency and cost-effectiveness of controlling feral pigs.

Control strategies. Long-term study sites have been established in Kosciuszko National

Park and at Yetholme. Research was conducted to determine suitable control strategies for feral pigs and other vertebrate pests if they became involved in an exotic disease outbreak. This investigation involved the development of suitable data collection techniques, including radio tracking and immobilisation.

Pastures Protection Boards

Boundaries. An extensive review of Pastures Protection District boundaries was started with the aim of achieving conformity between boundaries of Pastures Protection Districts and departmental regional boundaries.

To accomplish this, Pilliga Pastures Protection Board was abolished and its territory allocated to adjacent Boards. Boundary changes were introduced to a further 21 Pastures Protection Districts.

Legislative changes. In 1986, a revised system of Pastures Protection Board rating was introduced. Before the changes, rates had been assessed on actual stock numbers, which, in the light of recent High Court judgements, could be considered an excise. The new system of rating involves assessment of the carrying capacity of ratable land and includes a component for animal health services supplied by Boards if an occupier has livestock.

Pastures Protection Boards agreed to a request from the Meat Industry Authority for them to collect the Meat Industry Levy, which is used partly to finance its operations. The High Court had handed down a judgment that collecting income using the number of cattle slaughtered at abattoirs was illegal. Pastures Protection Boards now collect the levy based on carrying capacity of ratable land. Costs to the rural community will be considerably reduced by the Boards acting as agent for the Meat Industry Authority.

An amendment to the Pastures Protection Act now allows travelling stock reserves to be used for various recreational purposes. Two categories of recreational use are described:

- prescribed uses, which permit walking, picnicking, swimming, fishing, horse riding and cycling
- authorised activities, where Pastures Protection Board approval is required; activities such as gymkhanas and pony club trials fall into this category.

The traditional use of travelling stock reserves for travelling or agisted stock remains a priority.

Regulatory

Large Stock Brand Register. The Department started the first major revision of the Large Stock Brand Register since 1921. An accurate register is needed as fire branding (and also freeze branding in the case of horses) is the only legal method of identifying the owner of stock. It is used extensively by producers, the Police Department, owners of stud horses and council staff.

The revision has received full support by industry organisations, particularly Pastures Protection Boards.

Survey for organochlorines. Late in 1985 several NSW dairymen produced milk with dieldrin residues above the Maximum Residue Limit (MRL), which resulted in their being put off supply. An investigation isolated the problem to contaminated stockfeed ingredients.

A follow-up survey of manufactured poultry, pig and dairy stockfeeds, milling by-products and grains was implemented to determine the extent of contamination by organochlorines in stockfeeds. Results to date from 140 samples tested have found only one manufacturer with residues above the MRL. These products were withdrawn from sale. Further sample testing is continuing.

Animal welfare

The Department created a new position of Livestock Officer (Livestock Handling and Transport). This officer will assist in the continued development of the Department's animal welfare programs.

Legislation. Legislation affecting animal welfare is included in the Veterinary Surgeons Act, 1986, and the Prevention of Cruelty to Animals (Prescribed Deficiencies) Act, 1986. These two Acts clarify the age limits for surgical procedures that may be used as normal animal husbandry practices.

All projects involving animals in research are now subject to approval by an Animal Experimentation Ethics Committee in order to conform to the Animal Research Act, 1985.

Research. Research carried out by the Department has established a reliable technique for measuring the level of stress experienced by an animal.

Advisory. Codes of practice are being developed for all species of agricultural livestock. They will include recommended standards for the management of livestock to ensure a high level of welfare for the animal involved.

The Department has prepared codes of practice for deer, goats, dairy cattle and pigs, while those for sheep, poultry and beef cattle are well advanced. They are being developed in consultation with the Animal Welfare Advisory Council and the relevant industry organisations.

The Australian Agricultural Council has endorsed a further code of practice for the welfare of animals to be adopted by all States, which deals with air transportation of livestock.

Other welfare matters reviewed during the year were the interstate movement of livestock (particularly loading capacities), horse transport and the growing practice of teeth grinding of sheep.

Liaison. The Department is cooperating with other States to develop a uniform approach to animal welfare.

Within NSW, priority is being given to the handling and transport of livestock, particularly those destined for slaughter. Investigations are concentrating on identifying factors responsible for stress and bruising in cattle between farm and abattoir. A further step has been the formation of the Beef Cattle Handling and Transport Working Party.

NATURAL DISASTERS RELIEF

Up to 32 of the State's 57 Pastures Protection Districts were drought-declared at some time during the year.

The Department administered the certification and payment of drought relief transport subsidies.

Expenditure on drought relief transport subsidies was \$1,354,406 and drought loans totalling \$6,557,289 were approved by the Government Agency Section of the State Bank of NSW.

Climatic loans for storm and hail damage totalling \$1.7 million were also approved by the State Bank.

INTENSIVE ANIMAL INDUSTRIES

POULTRY

Three major advisory activities were conducted during 1985-86 aimed at providing performance data on the egg producing industry.

The National Farm Management Recording Scheme (NFMRS)

This Scheme measured the efficiency of 90 commercial flocks (about one million hens) and established the 'average' or standard performance. It will help farmers, research and advisory workers, and industry to plan, forecast and budget their operations to achieve greater efficiency.

The graph shows an increase in egg production, plus an increase in the percentage of 60g eggs. This occurred with only a marginal increase in feed consumption and a decrease in death rate. An economic evaluation showed a doubling of returns per hen housed per year from \$4.04 to \$8.08.

The Random Sample Layer Test (RSLT)

This Test is conducted annually to measure, under carefully controlled conditions, the performance of all strains of layers sold in NSW. It is also used as a benchmark against which to measure the performance of commercial flocks of similar strains in the field.

Local Consensus Data Surveys

In addition to the NFMRS and the annual RSLT, Local Consensus Data Surveys (LCD) were conducted to obtain data on the costs and returns of egg production in flocks ranging in size from 9000 to 60 000 laying hens.

The information from the RSLT, NFMRS and the LCD has been used to identify production levels and possible cost economies in commercial egg producing flocks. It has also been useful in setting priorities for advisory programs as well as in guiding farm management planning and decision-making.

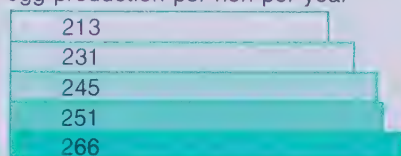
Housing

Poultry advisory officers contributed to the preparation and editing of a Working Party Report to the Standing Committee on Agriculture (SCA) into 'energy conservation and the provision of optimum temperature conditions for poultry and pigs'. The Working

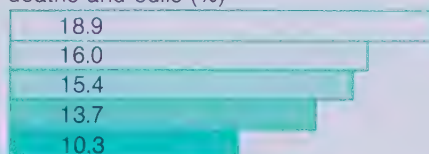
Party estimated that suboptimal environments are costing the egg industry about \$8.4 million and the chicken meat industry about \$6.4 million each year.

Increases in the efficiency of egg production 1976 to 1985 as measured by the National Farm Management Recording Scheme (Eggs) conducted by the NSW Department of Agriculture.

egg production per hen per year



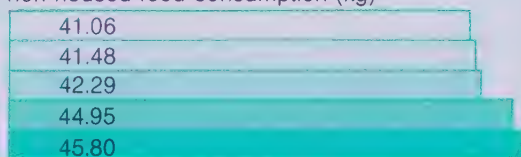
deaths and culls (%)



60 g eggs (%)



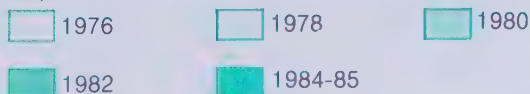
hen housed feed consumption (kg)



economic evaluation per hen housed per annum (\$)



Key



* All costs and returns based on 1985 values. Valiable costs only. Fixed costs and Egg Corporation quota levy not deducted.

The Working Party's recommendations are being implemented in NSW with a layer and broiler housing survey already undertaken.

Nutrition

Substantial gains are possible in the formulation of poultry diets and the reduction of feed wastage. Feed costs represent about 50% of the total cost of egg and chicken meat production, so small gains in feed efficiency have significant economic consequences.

About 700 individual diets were formulated for farmers and small stockfeed manufacturers by the Department's poultry advisory officers using computerised least-cost programs. This approach to diet formulation has achieved cost savings of \$5 to \$10 per tonne for about 50 000 tonnes per year. At an average cost saving of \$7.50 per tonne, this gives an annual reduction in feed costs of \$375,000. There is also evidence that many of the diets formulated by departmental officers reduced feed intake or gave superior performance in egg size and production.

The Department conducts chemical analyses on stockfeed ingredients and prepared diets. About 350 samples were submitted and 1060 separate analyses made in support of the Department's nutrition advisory program.

Other activities

The Department actively promoted and provided technical information on the production of turkeys, ducks, geese, quail and other game birds. Inquiries in commercial goose production increased substantially during the year.

Liaison

A new Poultry Industry Liaison Group was formed to improve industry liaison. The Department, along with the Livestock and Grain Producers Association, the NSW Egg Corporation and the Poultry Farmers Licensing Committee, formed the Egg Industry Planning and Forecasting Committee.

The Department has cooperated fully with efforts to coordinate the poultry advisory services of all State departments of agriculture. Interstate telephone hookups have been held, Agfacts and other literature have been exchanged and joint workshops have been organised.

PIGS

Improved pig management

The main pig advisory program has two components: 'Go for growth' implemented in 1985-86, and 'Survival', to be implemented in 1986-87. As part of the 'Go for growth' segment, workshops were held in the major pig producing areas concentrating on improved growth rate. Producers attending the workshops collectively owned over 15 000 sows. These producers have indicated that it is one of the most successful pig programs undertaken by the Department.

As part of the program, livestock officers conducted a statewide performance competition in conjunction with the NSW Pork and Bacon Fair held at Young. This helped producers identify the fast growing meaty strains of pigs. Seventy producers entered the competition at six state abattoirs.

Follow-up by livestock officers has indicated that producers are now concentrating on monitoring feed intake. Diet formulation changes, through identification of the level of feed intake, make increased growth rates possible.

Boar Performance Test Station

This Station was established in 1985 as part of the program on improved pig management. Up to April 1986, 250 boars had been tested for daily weight gain, back-fat and feed conversion ratio. Results to date indicate considerable variation between herds. This may indicate potential for breeders to improve the productivity of herds by selection or purchase of improved sires.

'Piggy bank'

A farm management recording scheme called 'Piggy bank' has been in operation for three years. Comparative data from the scheme have helped livestock officers identify breeding and production problems. Major areas for concern are slow growth, farrowing interval and low numbers of progeny sold per sow. These problems will be studied through the interregional program 'Improved pig management'.

Least-cost diet service

Livestock officers have provided a least-cost diet service to producers who home-mix their feed. This service has been well accepted and has resulted in lower feed costs and improved carcase quality.

Pig Industry Liaison Committee

A Pig Industry Liaison Committee was formed by the Department, comprising representatives from the stud industry, commercial producers, wholesalers, processors, feed companies and the Department. At its first meeting in February 1986, the group identified areas of concern requiring action by the Department and other sectors of the industry.

Triticale

This cereal contains some factor that depresses growth when fed to pigs at high levels. It is now recommended that triticale make up no more than 50% of the cereal base in diets for grower-finisher pigs. Also, the major varieties of triticale are now being monitored each season, in an attempt to identify varieties that are more suitable for use in the diets of growing pigs.

Lysine

Separate-sex and mixed-sex feeding experiments found that females require less dietary lysine than males when offered unrestricted amounts of feed. Feed cost savings could therefore be expected from separate penning of the sexes and the feeding of lower dietary lysine to females. The experiment also provided the first information on the unrestricted food intake of a range of NSW pig genotypes under commercial conditions.

APICULTURE

Advisory

The Apiary Branch has three major advisory programs: crop pollination, disease control and improved breeding. First year trial results from the pollination program have shown the potential for major improvements in sunflower and rockmelon yields. The disease control program has been successful in helping beekeepers identify different diseases and implement control measures.

About 180 beekeepers attended two major field days at Tocal Agricultural College on pollination. One thousand people visited the beekeeping display at Mudgee Small Farms field day.

The statewide quarterly newsletter, *Bee briefs*, with a circulation of over 2000 copies, keeps producers abreast of technical developments and industry trends.

The nine members of the Apiary Branch of the New Zealand Ministry of Agriculture and Fisheries undertook a week's in-service training with the Department.

Research

The original research work on gamma radiation of hive material to control bacterial bee diseases was undertaken in NSW. Authorities in other States and the United Kingdom are now also using irradiation. The first commercial gamma radiation plant in NSW was opened last year.

Further research is evaluating various methods of antibiotic treatment for European foulbrood and developing more sensitive techniques for the diagnosis of bacterial diseases.

Regulatory

A new Apiaries Act was introduced. The Act is being implemented in stages with full implementation by 1 July 1987.

New South Wales has 4300 registered beekeepers with a total of 250 000 hives. Apiary inspections revealed 70 outbreaks of American brood disease involving 449 hives. Two thousand seven hundred and forty-two boxes of infected combs were sterilised by irradiation, saving the industry over \$60,000 in replacement costs.

Ethylene dibromide was banned as a fumigant to control the honey bee pest, wax moth, and replaced with a safer compound, Phoxtoxin^(R).

Evidence was given at an Industries Assistance Commission Inquiry on the biological control of all *Echium* species, particularly Patersons curse.

Apiary officers destroyed European wasp nests and trained agricultural inspectors in wasp control.

Diagnostic

The Department's five regional veterinary laboratories provided bacterial disease diagnostic services for beekeepers. The main diagnostic laboratory for bee diseases is the Central Veterinary Laboratory, Glenfield, where staff are able to diagnose bacterial, viral and fungal diseases.

Pests and parasites are identified at the Biological and Chemical Research Institute, Rydalmere. The diagnostic service makes a major contribution to controlling diseases of honey bees.

ANIMAL HEALTH SERVICES

LIVESTOCK HEALTH PROGRAMS

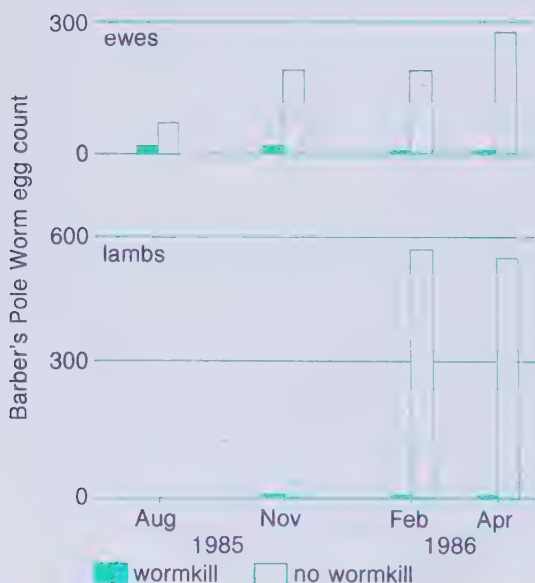
Sheep health

Drenchplan. A worm control program for sheep in the South West Slopes started in December 1985 as a cooperative venture between the Department, CSIRO and Pastures Protection Boards. The program has two main components: advice on the timing of treatments and the recommended drenches; and monitoring to ensure effectiveness of the recommendations. Monitoring includes regular sampling of sheep on selected properties and testing at the Regional Veterinary Laboratory, Wagga Wagga.

The program provides effective control of the two most important internal parasites of sheep in this area (*Trichostrongylus* and *Ostertagia*). Drenching frequency is reduced compared with traditional drenching practice. The recommendations significantly reduce the costs of worm control and delay the development of drench resistance.

Wormkill. The Wormkill strategic drenching program for sheep in the Northern Tablelands, Slopes and Upper Hunter is a collaborative venture between the Department,

The Wormkill program significantly reduced the incidence of barber's pole worm in sheep in the Northern Tablelands.



CSIRO and Pastures Protection Boards, and has been highly successful. The Regional Veterinary Laboratory, Armidale, provides the laboratory resources for an ongoing monitoring program.

The Wormkill program is a practical solution to the problem of anthelmintic resistance in black scour (*Trichostrongylus* species) and brown stomach (*Ostertagia* species) worms in sheep. It reduces the number of broad-spectrum treatments required to control these parasites and makes effective use of Closantel^(R) to control barber's pole worm (*Haemonchus contortus*).

Overall adoption of the program by producers rose from 80% in 1984-85 to 90% in 1985-86—an excellent achievement for a voluntary disease control program. A 49% reduction in sales of broad-spectrum drenches indicates how drenching practices have changed.

The savings to the sheep industry on the Northern Tablelands in 1984-85 were estimated to be \$1.77 million and this should rise to \$2.52 million in 1985-86 with the increase in adoption level.

Barber's pole worm has been an important cause of deaths, lowered production and high use of anthelmintics on the Northern Tablelands. On properties using the Wormkill program the parasite has been almost eliminated, as shown in the accompanying graph. The successful near-eradication of barber's pole worm on Wormkill properties has led to the development of Wormkill II for 1986-87 when the number of Seponver^(R) treatments will be reduced.

Footrot advisory program. This program started in 1983 after the breaking of the drought greatly increased the risk of footrot outbreaks, and continued through 1985-86. Special emphasis was given to the high-risk areas of the State such as the Riverina and Southern and Central Tablelands.

The program has encouraged sheep owners, either as individuals or as a group, to undertake voluntary control and eradication activities. As an example, a voluntary footrot control group was formed in an isolated valley in the Hume Pastures Protection District. Sheep owners approached the Department for veterinary assistance in eradicating footrot from the area and a program

was drawn up to achieve this within three years. This group may well serve as a model for other areas.

New England Protected Area (NEPA).

NEPA was established in 1960 to protect sheep flocks on the Northern Tablelands from footrot and has been progressively enlarged so that it now includes the north-eastern portion of the State. Five million sheep in 5000 flocks are now included in the area. When it was established, the level of footrot was low, but this was threatened by development of improved pastures. Since then the level of footrot outbreaks each year has been consistently kept below 40, except for 1984 when restocking after the drought resulted in introduction of infected sheep.

A cost-benefit study showed that there are significant benefits to sheep owners in the area through reduced production losses and savings in precautionary costs.

During the year the program was reviewed to make it more effective. The main changes to the program are:

- the introduction of an advisory program that emphasises the need for sheep owners to take special precautions with sheep introduced from outside NEPA, and improves understanding of the disease
- an evaluation of new treatment, control and eradication procedures and adoption of those that prove most effective
- using skilled inspectorial staff where they are most effective, such as advising sheep owners on segregation of clean and infected sheep.

Sheep lice. Surveys of sheep owners have shown that 30% or more of all sheep flocks in NSW were infested with lice before the last shearing. Ten per cent of owners admitted having sheep lice in each of the last two years. Based on results of the owner surveys, sheep lice are estimated to cost the NSW sheep industry \$36 million a year.

During 1985–86 the Department reviewed its sheep lice policy and decided to increase emphasis on providing advice to sheep owners rather than on regulatory control. The new program will determine why there were breakdowns and apparent dipping failures and provide graziers with advice on the best method of controlling or eradicating sheep lice from a flock. The program also includes gathering information on the effectiveness

of the chemicals and dipping methods currently used.

Ovine brucellosis accredited free flock scheme. This scheme was introduced in 1981 to encourage the establishment of brucellosis-free stud flocks. The scheme is a cooperative effort between breed societies, private veterinary practitioners and the Department.

Lists of flocks that have achieved accreditation are published and commercial sheep producers can now be confident that rams purchased from accredited flocks are brucellosis free. Brucellosis has been a significant cause of poor reproductive performance. The scheme has resulted in improved lambing percentages and reduced the number of rams required in a commercial flock.

Sheep industry support for the scheme has continued to increase, and during 1985–86 this was especially the case amongst Merino studs. Over 1030 individual sheep flocks are now accredited. These represent 55% of studs and 70% of rams sold in NSW. All breeds are represented, and accredited rams are available all over the State.

Anthrax. Outbreaks of this disease occur each year in the traditional 'anthrax belt', which runs between Bourke and Moree in the north and between Albury and Deniliquin in the south. Losses occur mainly in sheep, but also involve cattle, horses, pigs and dogs. This year 17 outbreaks were notified to departmental veterinary officers. Severe losses of 1300 sheep on two properties occurred during February. Total deaths for the year were almost 1700 head.

As anthrax can be contracted by humans, departmental officers contacted health authorities whenever there was a risk of human infection.

On the outbreak properties, further losses were controlled by compulsory vaccination and advice given on the need for voluntary preventative vaccination.

Dairy cattle health

Enzootic bovine leucosis. Following a survey that showed a high level of bovine leucosis in Illawarra Shorthorn cattle, the Illawarra Cattle Society and the Department planned a voluntary eradication and accreditation scheme. Enzootic bovine leucosis is caused by a virus and can cause high mortalities in

some herds. The scheme is important to the NSW industry because there are significant sales of Illawarra Shorthorns to Queensland, and the presence of the disease jeopardises this interstate trade.

Milk drop syndrome. This condition is characterised by a sudden drop in milk production in a dairy herd. Veterinary staff investigated many herds where this occurred. Lowered milk production can cause substantial financial loss and threaten maintenance of milk quotas. Common causes were ephemeral fever and leptospirosis. Ephemeral fever is a viral disease spread by biting insects, and is commonly known as three-day sickness. Leptospirosis is well known as a cause of abortions and lowered milk production in adult cattle, and deaths in calves.

In 10 herds the cause was not immediately obvious and intensive investigations were carried out by departmental veterinary officers. The herds had a high proportion of cows with high body temperature and drop in milk production. The feeding of mouldy grain was implicated in most cases.

Dairy cattle fertility. A survey by the Department of 31 herds in the Bega area showed that poor fertility was a problem. Cows should be back in calf by 85 days after calving to achieve a calving every 12 months. In the herds studied the average time from calving to conception was 100 days, but the range was 35 to 156 days. Conception rates using natural service were satisfactory (66%), but those farmers seeking better genetic gain by the use of artificial insemination had the disadvantage of a lower conception rate (59%).

Pig health

With increasing intensification in the pig industry, the Department carried out a survey to determine the major health problems. The survey results indicated that reproductive wastage, colibacillosis, pig health abattoir monitoring and respiratory disease were areas where the Department should put high priority. These priorities reflect industry's need for better recognition and control of subclinical disease. Programs are already available for colibacillosis and the pig health abattoir monitoring scheme.

Colibacillosis. Colibacillosis (caused by *Escherichia coli*) is an important bacterial disease of young pigs, causing mortalities;

diarrhoea and reduced growth rate. A vaccine has now been registered to help control colibacillosis after farrowing and another vaccine is being tested to control colibacillosis after weaning. Departmental veterinary officers are monitoring the effectiveness of these vaccines.

The Regional Veterinary Laboratory, Wagga Wagga, is a reference centre for the disease in NSW. It maintains comprehensive records on all outbreaks of colibacillosis and provides comprehensive testing facilities.

Pig health abattoir monitoring. In conjunction with the Export Inspection Service of the Commonwealth Department of Primary Industry, the NSW Department collects information on nine significant diseases of pigs in five major abattoirs. Departmental veterinary officers collate the information and provide reports to pig producers on a regular basis. During the year specifications were completed for the upgrading of the existing computerised information system on AGNET. The upgraded version produces more comprehensive and timely reports to pig producers, meat inspectors and veterinarians.

Goat health

The goat industry is developing rapidly in NSW. There has been an associated increase in animal health problems and an increasing involvement by departmental veterinary staff.

Veterinary officers helped goat owners with widely varying understanding of animal health matters. The areas of activity included advice on disease control programs, providing a field and laboratory diagnostic service, maintaining regulatory control of certain diseases and undertaking research projects on important goat diseases. Liaison with goat breeding societies and producer organisations was maintained to ensure that departmental officers were offering an effective service. Four specific problems received priority during the year.

Johnes disease. Johnes disease is an important cause of reduced production in commercial dairy goat herds. Common symptoms are loss of weight, diarrhoea and death. Veterinary staff carried out investigations on diagnosis and spread of the disease, which have resulted in improved methods of diagnosis and control. A study was also started to determine the economic importance of the

disease. The study will help devise control programs that are in keeping with the needs of industry and of individual producers.

CAE accreditation scheme. There was a high demand in 1985–86 from New Zealand for Australian-bred Angora goats. Much of this demand was met by NSW producers and provided a significant boost to the industry. A condition imposed by New Zealand was that flocks supplying goats had to be free of caprine arthritis encephalitis (CAE). This is a viral disease causing nervous signs, arthritis, pneumonia, loss of weight and eventual death.

Veterinary staff developed an accreditation scheme that met the New Zealand requirements and that was acceptable to the industry. The Department administers the scheme and sampling is done by private veterinarians. Testing of samples is carried out by a private veterinary laboratory, with antigen supplied by the Central Veterinary Laboratory, Glenfield. The Central Veterinary Laboratory also supplies antigen to Tasmania, South Australia and Victoria. In the first two months of the scheme almost 11 000 goat sera samples from 116 different owners were tested.

Roundworm parasite control in goats. The Wormkill program for sheep has been adapted by departmental veterinary staff for goat flocks and has shown early promise. The program has been well accepted by producers on the Northern Tablelands and the Hunter Valley.

Control of barber's pole worm has been excellent, equalling the results found in sheep, using Saponver^(R) every three months. Monitoring of the program indicates that failures do occur and are due to the following causes:

- anthelmintic resistance in black scour and brown stomach worms
- underestimation of liveweights, with resultant under-dosing
- high stocking rates and no access to browse material
- under-nutrition, which lowers resistance to internal parasites.

These issues, and others such as the optimum dose rates of anthelmintics for goats, will be included in the 1986–87 Wormkill program for goats.

Fish health

In 1985–86 research concentrated on two diseases of economic importance in the fishing industry.

Goldfish ulcer disease. This disease appears to have been introduced into Australia with goldfish imported from Japan in 1974 and occurred for the first time in NSW in 1985. Two hatcheries that supply native fish fingerlings to water catchment areas and for farm dams were affected, one being the Department's Inland Fisheries Research Station (IFRS) at Narrandera. Because of uncertainty about the susceptibility of native fish and trout, and the risk of spreading the disease with fingerlings, the native fish breeding programs at IFRS were suspended.

The disease was successfully eliminated from the IFRS and studies were conducted at Wagga Wagga to determine if native fish were susceptible and whether they could harbour and transmit the infection. Golden perch, silver perch and Murray cod fingerlings were found to be resistant. Work is continuing on trout.

Red spot. Red spot affects economically important estuarine fishes in rivers along the North Coast of NSW, particularly in the Clarence River, which supports one of the most productive estuarine fisheries in the State. Commercial fishers using the River are concerned that marketable catches and fish stocks may be severely reduced. Affected fish develop deep ulcers and are often not marketable.

Various studies were carried out during 1985–86, which included measuring the level of disease, recording water quality in the Clarence River, ulcer development in sea mullet (*Mugil cephalus*) and analysis of water quality data collected by the State Pollution Control Commission.

REGULATORY PROGRAMS

Cattle tick control

The Minister announced, in July 1983, a new policy for tick control by the Board of Tick Control (BTC) within the Tick Quarantine Area (TQA). Since then there have been discussions with livestock owner groups and the BTC, and the Cattle Tick Advisory Committee was established. This Committee has periodically reviewed the tick position and made recommendations to the Minister.

As a result of these discussions and decisions, some changes were made to the original policy.

During 1985–86 the new policy was successfully implemented. The main features were:

- The establishment of a buffer zone along the Queensland border from Legume to east of Murwillumbah. Within this zone there was a compulsory supervised dipping program of six dippings at 3-week intervals between October 1985 and February 1986 in dips maintained and controlled by the BTC. During these supervised dippings, cattle were examined for ticks. No tick infestations were detected.
- In the rest of the TQA, to the south of the buffer zone, the policy was to encourage owners to undertake voluntary control measures in cooperation with the BTC.
- A major development in this area was the handover of dip maintenance and dipping procedures to livestock owners. Under this policy, users of a particular dip formed a dip group and appointed a dip-group coordinator. Under the formal Stockowners' Agreement, the BTC undertook to have the tickicide in the dip wash at full concentration at the date of handover and to repair the yards to a serviceable condition. Thereafter, the BTC would carry out analyses of dip wash and provide free tickicide to maintain the recommended working concentration. For their part, dip group members undertook to maintain the yards and manage the dipping procedures. Where a dip group did not form, the BTC remained responsible for the dip and livestock owners paid a fee for its use. Out of a total of 911 dips, 813 (89%) were taken over by livestock owners. Experience during 1985–86 showed that most groups managed their dips well.
- An intensive advisory program was mounted to encourage owners south of the buffer zone to undertake a voluntary dipping program of six dipping treatments at 3-week intervals between October 1985 and February 1986. Records kept at dips showed that most farmers followed these recommendations, but there were some who either did not dip at all, dipped at less than the recommended number of dippings, or dipped at irregular intervals.
- As an alternative to dipping, the use of

'pour-on' tickicide preparations was allowed. In this case the owner had to purchase the pour-on preparation. The recommended procedure for the use of pour-on tickicides was four treatments at 5-week intervals. About 6% of farmers elected to undertake pour-on treatments rather than dip their cattle.

- All cattle in this area were subjected to an annual examination between February and May 1986. Surveillance of cattle at saleyards and at abattoirs also continued. As a result of these surveillance and examination procedures, 20 infested properties were detected. None of the owners had undertaken the recommended treatment procedures. It should be noted that similar infestations have occurred annually, ever since the BTC came into existence. The number per year has ranged from four to many hundreds.
- All infested properties were subjected to the standard eradication procedures of quarantine and a compulsory supervised dipping program of 13 dippings at 3-week intervals, or eight pour-on treatments at 5-week intervals at the owner's expense. Adjoining properties were ordered to undertake a six-treatment dipping program, or four pour-on treatments. Examination of stock at May 1986 showed that the infestations were eradicated.

No cases of tick fever were found in the TQA during the year. It is part of the policy that vaccination against tick fever is not allowed.

Many other aspects of tick control were not changed under the new policy. These included the requirements for movement of stock from Queensland to NSW, movements from the TQA to clean country in other parts of NSW, and saleyard and abattoir surveillance.

No changes were made to policies for areas of NSW outside the TQA. However, three areas were found with cattle tick outside the TQA, in the Fine Flower, Chamberlaine and Kangaroo Creek districts. Control procedures were undertaken immediately and have been successful.

The new policy in the TQA is meeting with owner cooperation and successfully controlled ticks in its first year of operation. The outbreaks outside the TQA were not traceable to changes in tick control policy.

Brucellosis eradication campaign

The brucellosis eradication campaign is now entering its final phase. The third round of testing of all herds progressed satisfactorily and the prevalence of brucellosis was further reduced in 1985–86 as shown below.

Of 55 500 herds in the State (with about 3.5 million breeding cattle), only two herds are currently known to be infected.

During the year brucellosis was found in nine herds. Extensive investigation was carried out by veterinary staff to determine if the disease had spread to other herds, and the infected herds were studied to determine the best methods of eradication. All breeding cattle were slaughtered in four infected herds.

Three of the herds were detected initially by monitoring blood samples collected at abattoirs. This method of monitoring, along with milk ring testing of dairy herds and tracing from infected herds, will become the main method of identifying infected herds in the future. The Department aims to have all herds free from brucellosis by 1988.

A major advisory program, started in 1983, has continued to alert the cattle industry and producers to the dangers of brucellosis while any disease remains. As part of the program, the Department produced three community service announcements that were broadcast over the whole State, including Channel 7 in Sydney. Channel 2 showed the announcements at the end of two of their 'Countrywide' programs. Penny Cook, a well known personality in the television program 'A Country Practice', featured in the announcements.

As part of the advisory program, 65 000 ten-page brochures on brucellosis were produced and delivered by direct mail to all active registered tail-tag owners in NSW. The content of the brochures tied in closely with the television campaign and served to supplement and reinforce the message. A letter

signed by the Minister was enclosed with each brochure to emphasize the importance of the brucellosis eradication campaign.

Tuberculosis eradication campaign

There were three laboratory-confirmed abattoir tracebacks. Using tail-tag traceback, the herds of origin were identified. In two of the herds, tuberculosis was confirmed on subsequent testing and all cattle were slaughtered. The disease was not confirmed in the third herd and it is in quarantine awaiting further testing.

A herd that was found to be infected in 1984–85 was slaughtered in February 1986 after testing showed continuing infection.

A large intensive dairy herd that had been under test since 1982 had negative results in 1985–86. This was a major achievement for a herd that had high levels of infection and many hindrances to successful eradication.

During a survey of all dairy herds in NSW in 1984–85, a number of herds had reactors to the tuberculin test, yet no lesions were found on slaughter. During 1985–86 most herds in this category were check-tested using the comparative tuberculin test to ensure their freedom from disease.

Exotic disease

In May 1985, the Victorian Department of Agriculture and Rural Affairs notified the presence of a serious exotic disease called avian influenza on a large poultry complex at Bendigo. The Consultative Committee on Exotic Diseases agreed with the diagnosis, and the proposal to slaughter the 100 000 hens and chickens on the property, and the destruction of all poultry products, with compensation and other costs to be shared among the States.

New South Wales prohibited the introduction of poultry and other birds, and poultry products from Victoria. These restrictions were progressively relaxed as the situation

Brucellosis prevalence in NSW 1977–86 (as at 30 June)

	1977	1979	1981	1983	1985	1986
Number of herds infected	8 983	3 446	644	125	87	2
Percentage herds infected	29.5	9.75	1.31	0.23	0.16	0.004
Percentage cattle infected	3.1	0.21	0.06	0.01	0.01	<0.001

Source: Australian National Disease Information System



The Department's brucellosis eradication campaign featured Penny Cook from the program 'A Country Practice' in community service announcements on television.

became clearer in Victoria. Subsequently, the disease was successfully eradicated from Victoria.

Veterinary staff carried out an extensive surveillance program of the poultry industry to determine if the disease had spread to this State. About 25 000 birds were tested on 238 farms with all results being negative.

Animal quarantine and livestock exports

The Department continued to act as agent for the Commonwealth Department of Primary Industry in implementing animal quarantine policy in NSW. Departmental staff also supervised the preparation of animals for export and provided the necessary health certificates.

A significant development was the international acceptance that Australia was free from contagious equine metritis, a highly contagious disease introduced in 1977 that causes infertility in mares. Acceptance of this status has resulted in the removal of all restrictions and testing associated with the import and export of horses. The costs of testing, which were considerable, have now been eliminated, and additional markets for the export of horses have become available.

New conditions for the export of sheep, goats, goat semen and embryos, and sheep embryos to New Zealand were applied in January 1986. The new conditions allowed goats and sheep from NSW to be considered for export to New Zealand after a quarantine period.

A shipment of deer that arrived from New Zealand in December 1985 were the first imported under conditions agreed to in September 1985. The animals underwent a 100-day quarantine after arrival, and were isolated from all other livestock. These conditions now provide suitable security against *Elaphostrongylus cervi*, an internal parasite of deer that causes extensive damage to venison.

During the year, health conditions were finalised for the importation of horses direct from France, Sweden and the USA, bovine semen from the USA, and cattle embryos from Canada and the USA.

ANIMAL HEALTH RESEARCH

The Central Veterinary Laboratory, Glenfield, is an important centre for animal health research in NSW. The five regional veteri-

nary laboratories also conduct research projects on problems of regional importance. Following are the most significant achievements in 1985-86.

Advances in disease diagnosis

New diagnostic tests for virulent footrot and ovine brucellosis were investigated using the Elisa test. Comparative studies were made on antigen derived from the whole cell of the bacterial organisms, and from proteins of the inner and outer membrane layers of the cells.

In experiments on *Brucella ovis* infections in rams, sensitivity of the Elisa test was increased substantially by using antigens derived from cell membranes of the organism. *Brucella ovis* is a bacterium that causes brucellosis in sheep, an important cause of infertility in rams. The test will provide a superior method for detecting rams that carry the disease and do not react to currently used tests.

In footrot studies, a search has been underway to identify a common protein of *Bacillus nodosus* that is identical in eight various strains of the organism, all of which are virulent for Australian sheep. *Bacillus nodosus* is the bacterium that causes footrot in sheep. This work will help in the development of a test to differentiate between virulent and benign footrot.

Sheep blowfly

Fleecerot dermatitis is caused by a bacterial organism called *Pseudomonas aeruginosa* and occurs in the skin of sheep after persistent rain. It is the predisposing cause of strike by the blowfly *Lucilia cuprina*. The aim of the research is to reduce the effects of *Pseudomonas aeruginosa* on the sheep's skin and so prevent fleecerot dermatitis. Studies examined the mode of action of enzymes produced by *Pseudomonas aeruginosa* at skin level. The enzymes were neutralised by antibodies produced by the sheep. A vaccine will now be developed for field testing.

Neurological disorders of genetic origin in cattle

A group of conditions, collectively called neuraxial oedema, has been identified from detailed clinical and pathological observations. They cause various forms of nervous derangement in newborn calves. Livestock producers helped by supplying new-born calves showing the unusual sickness.

In 1985-86, the neuraxial oedema complex, which is well known as an important condition of Poll Hereford and Poll Hereford-cross calves, was separated into two diseases. The cause of one disease, called maple syrup urine disease, is already known and tests for the detection of carrier animals are being developed. The cause of the other disease, called inherited congenital myoclonus, is not yet known. Both diseases are inherited, and affected calves are unable to stand after birth or become paralysed after a few days.

A new genetic disorder of Friesian cattle called citrullinaemia was identified at Glenfield. Affected animals have nervous signs and die within three days of birth. The disorder is inherited as a recessive gene. A bull known to have sired affected calves has been removed from an artificial breeding centre in NSW. In order to further study this problem, laboratory methods for the identification of carrier animals are being developed using embryo transfer techniques.

Paramphistomes (stomach fluke)

Drenching trials on the North Coast showed that Nilverm^(R) was efficient against adult fluke in the rumen and the small immature intestinal fluke when used at a rate of 20 mg/kg. Almost total clearance of immature fluke from the intestine was achieved when the treatment was repeated three days later. This treatment will significantly reduce costs for farmers in coastal areas where stomach fluke contributes to major production losses in both young beef and dairy cattle.

CONSUMER PROTECTION

Veterinary Surgeons Act

An amended Veterinary Surgeons Act was passed by Parliament. Regulations are yet to be finalised. The principal changes to the Act were the inclusion of offence clauses, elimination of any clauses with actual or implied racial discrimination, and provision for costs to be awarded against veterinary surgeons found guilty of misconduct. There are over 1700 veterinarians registered in NSW and 508 premises that need veterinary hospital licences. Hospital licences have been issued to 457 premises. The rest either need repairs or alterations, or are yet to be inspected.

Artificial Breeding Act

The Stock (Artificial Breeding) Act, 1985, was passed by Parliament in November 1985, and during 1986 discussions were held with industry groups to establish guidelines for the regulations. Changes to the Act included provisions to regulate embryo transfer and removal of anomalies in the previous Act.

There are five centres and nine subcentres for cattle, and five centres and two subcentres for sheep semen production licensed under the Stock (Artificial Insemination) Act, 1948.

Stock medicines

At the end of the year, 1800 products were registered with the Stock Medicines Board. The Board considered 296 applications for registration of new products. As part of a monitoring program to ensure the quality of registered products, the Board's analyst tested 131 products for potency. Most of the products tested were of a satisfactory standard. Product groups tested included anabolic steroids, pyrantel embonates, levamisoles, corticosteroids, benzimidazoles and nitrofurans.

In 1985 the Board introduced a policy on vitamin and mineral supplements. Each product is required to have at least 50% of daily requirements for the intended species unless toxicity would be likely to occur. Figures from the National Research Council (US Academy of Sciences) will be used as a guideline for estimating daily requirements.

Another significant development was the withdrawal of the antibiotic chloramphenicol in any form (including aerosol sprays) from use in food-producing animals. This was so that it could continue to be used in human medicine.

Five companies were successfully prosecuted for selling unregistered stock medicines.

Chemical residues

The trend for agricultural and veterinary pesticide residues to disappear from meat products in NSW continued. This appeared to be due to changed farm practices, greater farmer awareness and increased legal restrictions, particularly on the use of the persistent pesticides.

Fat sampling of cattle, sheep and pigs continued in 26 NSW meatworks. Samples analysed were 6490 beef, 1228 sheep and 120 pig. Samples exceeding the acceptable level, known as the maximum residue level (in mg/kg) were:

Pesticide	Cattle	Sheep	Pigs
DDT	2	0	0
Dieldrin	16	1	9
Heptachlor	7	0	1

Grazing of contaminated pastures was the major cause of residues in cattle and sheep. In pigs, contaminated feed or treatment of housing were the most common causes. To ensure that whole milk met the required standards, sampling of rail and road bulk-milk tankers increased, with the Dairy Corporation taking over the task from September 1985. Some 512 bulk-milk fat samples were analysed with only six samples from eight farms having an unacceptable level of dieldrin. The residues were traced to contaminated bran on two farms and barley on the other six farms. The level of residue in most cases was only just above the set maximum residue level of 0.15 mg/kg, but one bulk test was 1.68 mg/kg.

When pesticide levels above the maximum residue level were detected, departmental staff quarantined the affected property, investigated the cause of the problem, advised stockowners on procedures to reduce the pesticide level, and monitored the livestock until they could be released from quarantine.

INFORMATION TECHNOLOGY

Vetlink

Specifications were prepared for an animal disease information system called Vetlink. It is planned to run on AGNET (the Department's computer network) and be progressively introduced from 1987. Vetlink is designed to help veterinary staff identify animal diseases of significance to the livestock industries of NSW, and to help in the development, management and evaluation of programs designed to reduce the effects of these diseases.

Vetlink integrates data gathering from departmental veterinary laboratories, field investigations of disease outbreaks, field research projects and diseases detected at

abattoirs. It also provides systems that help veterinary staff in specimen management in laboratories, and the management of major disease control projects being conducted by the Department.

Users of the system are provided with routine reports, and can use a query language to search the whole database when special reports are required.

ADMINISTRATION

Veterinary services review

The recommendations of the 1983 review of veterinary field services were implemented. In Head Office the functional responsibility of directors was altered to reflect changed functions in the regions, and a new directorate of Animal Health Services was established. In the regions, senior veterinary functions were split between administrative and regulatory matters, and technical management of disease control programs.

An improved paraveterinary structure was introduced and these staff now have more responsibility for managing routine regulatory matters.

Veterinary staff reviewed existing programs and determined the most significant disease problems in the major livestock industries. Priorities for programs and projects were established and in many cases the approved projects are now in progress or are at an advanced stage of development.



FISHERIES

Marine regulation and management

Marine research and development

Inland regulation and management

Inland research and development

MARINE REGULATION AND MANAGEMENT

FISHERIES MANAGEMENT

Coastal and estuarine fisheries

Metropolitan estuaries. The most significant development was the introduction of a management plan for prawn trawling in Botany Bay, Sydney Harbour and the Hawkesbury River. Only vessels that have been active over the past three years are now allowed to operate and most of these are restricted to one estuary. Endorsements are not transferrable, so the number of vessels will gradually decline.

Statewide management plan. In 1984 a fishing boat licence freeze was introduced pending the introduction of a statewide management plan for coastal and estuarine fisheries. A draft management plan was circulated to fishers' organisations and redrafted in early 1986 following feedback from industry and recent developments in overseas and interstate management practices.

The general aims of the plan are to: minimise disruption to fishers; prevent large increases in effort, except where development is warranted; restrict fishers to areas where they have traditionally operated; provide a mechanism for flexible management of individual species, methods or areas (or combinations of these); and enable effort reduction where this is found to be necessary.

This initiative is in keeping with the Department's Strategic Plan, which lists coastal and estuarine fisheries management as one of 11 areas to receive increased emphasis up until 1988.

Upgraded statistical system. Also listed as a priority area in the Strategic Plan is development of sophisticated computerised management and information systems that were designed during 1985–86. The integrated licensing and catch statistics system will enable comprehensive analysis of information as well as reliable and efficient licensing procedures.

Legislation. Major changes to legislation during the year were:

- amending the noxious fish section of the Fisheries and Oyster Farms Act, 1935, to include the Pacific oyster

- introducing block licences for crew members of fishing vessels
- amending the size limit on abalone and placing one on spanner crabs
- introducing fines by post (penalty notices) for minor offences.

Aquatic reserves. A review of the Department's policies and practices in relation to aquatic reserves was undertaken and the mechanisms for identifying, categorising and documenting details of areas were streamlined. Three categories of reserves were named: sanctuaries, refuges and parks. Ocean and estuarine reserves should be proclaimed in all three categories within the next few years, and existing ones reviewed to bring them into line with the new categories.

Environmental assessments. One of the major activities in this area was the streamlining of environmental assessments. Instead of scientific staff, regional officers will now conduct most inspections and investigations for local environmental studies and plans, and development proposals. This procedure should provide a much better service to the community.

Offshore fisheries

Management advisory committees. New South Wales is represented on three management advisory committees set up by the Commonwealth Government for fisheries that extend into the Australian Fishing Zone. The East Coast Trawl and South East Trawl Management Advisory Committees met several times and management plans were finalised, including boat replacement policies.

A task force was established to study the future implications of the rapid growth of the high-value sashimi tuna fishery off NSW. It met in Canberra early in 1986 and recommended the establishment of an East Coast Tuna Management Advisory Committee.

Offshore constitutional settlement.

Arrangements for the jurisdiction and management of fisheries that span both Commonwealth and State waters were started. The east coast trawl fishery off NSW will be managed by NSW, the tuna fisheries by the Commonwealth, and the southeast trawl fishery will be managed by the existing



The Minister, Jack Hallam, examining a set of shark jaws on an inspection of shark meshing off Bondi with Ernie Page, Member for Waverly. The Department administers four contracts, covering beaches from Newcastle to Wollongong, at a cost of over \$200,000 a year.

State-Commonwealth management advisory committee.

AQUACULTURE

Fish farms

With the increasing interest in both marine and freshwater aquaculture, a review of the Department's management of fish farming was undertaken at a workshop that comprised policy and management, law enforcement and scientific staff. Issues relating to all aspects of aquaculture, with the exception of oyster farming, were considered.

Administration was streamlined so that growth of the industry would not be inhibited unnecessarily by government regulations, and a standardised application form and reporting system were developed. A standard set of conditions was formulated that would apply to all species, with important conditions that only applied to some forms of aquaculture to be added to the standard conditions.

Workshop resolutions were embodied in draft regulations. Extensive liaison with other State government departments and local government authorities was undertaken on the development of fish farms. This was so potential fish farmers can be adequately informed of the broad range of approvals required and how their activities fit into the planning process.

Sydney rock oysters

Lease review. The statewide review of oyster leases continued and inspection of estuaries from Wonboyn River (Eden) to Hastings River (Port Macquarie) was completed. Inspection of 3414 leases resulted in 826 leases being identified as undeveloped or as having no foreseeable productive capacity. Lessees of these areas were invited to surrender their leases, with a review process for those who wish to retain them. To date, 153 leases have been surrendered and returned for public use. The remaining leases were continued on the understanding that they are, and will continue, to be used for oyster production.

In addition to the above review, the Department increased supervision of management of leased areas to ensure they are used properly and kept tidy. This has resulted in a substantial improvement of oyster lease use in all estuaries.

Industry liaison

To ensure that industry is fully aware of the Department's resolve to use proper controls and to involve farmers in the formulation of new management controls and legislation, the Department has established an Oyster Industry Liaison Committee.

The Department provided help, through the Committee, to industry on the following matters:

- access to the Rural Adjustment Scheme and information and advice on other similar schemes
- zoning of areas within estuaries for oyster farming
- formulation of a registration system for oyster leases when used as security to a lending institution
- representations to the Department of Finance over land tax levies on oyster leases
- relocation and marking of oyster leases.

Pacific oysters

Pacific oysters (*Crassostrea gigas*) have recently appeared in Port Stephens in large numbers. Under suitable conditions, they can breed prolifically and grow rapidly. They are grown commercially in many countries and form the basis of an industry in Tasmania.

Under suitable conditions Pacific oysters can replace native species within a few years; they may cause environmental problems by smothering foreshore areas; and they fetch lower prices due to their different flavour and inferior keeping quality as a fresh in-shell product.

Policies and action plans were formulated to attempt to limit the spread of Pacific oysters beyond Port Stephens.

A closure was implemented, requiring all Pacific oysters to be removed and destroyed before batches of Sydney rock oysters were transported for sale or to other areas. A logbook program was implemented to monitor movements and a joint industry-government inspection system set up.

In addition, the Pacific oyster was declared a noxious species in NSW and the Minister may now order the destruction of Pacific oysters on leases and prosecute farmers who fail to do so.

In early 1986 there was another large spawning by Pacific oysters in Port Stephens and, more importantly, the species appeared

in large numbers in several other estuaries where low densities were previously recorded. The Department undertook further measures in an attempt to protect the Sydney rock oyster industry and prevent Pacific oysters becoming even more widespread.

LICENSING

During the year 2819 NSW commercial fishing licences and 3542 commercial fishing boat licences were issued—a reduction of more than 10% in the number of licences issued for the previous year. This is a result of the Department's stricter controls for the issue of a new licence and the renewal of an expired licence, and also of the introduction of block licences.

A new NSW commercial fishing licence will only be issued to a person who can clearly demonstrate that he or she has the necessary qualifications or capacity to successfully engage in the industry. Since the 'boat freeze' is still operational it means that any prospective applicant will need to purchase a licensed fishing boat or have employment confirmed as a crew member/deckhand for an already licensed fisher. As neither option is readily available, the number of applications has declined.

In addition, a firmer policy has been adopted in relation to renewal of a NSW commercial fishing licence. As well as satisfying the legislative requirements, an applicant must also be able to demonstrate a significant involvement and commitment to the industry.

The actions outlined above are supported by most commercial fishers and recreational fishers alike.

The freeze on the issue of additional NSW commercial fishing boat licences is still operational, pending completion of management plans. However, during the year it has been varied slightly:

- to permit an abalone diver to licence a second 'travelling' boat, licensed exclusively for the abalone fishery and not exceeding 7.5 metres in length
- to allow fishers to comply with Maritime Services Board requirements, approval was granted to allow for small line and trap boats that are licensed for both State and Commonwealth waters operations to be replaced up to a maximum overall length of 7.5 metres

- to allow vessels less than 5.8 metres long to upgrade to that length for safety reasons.

Block licences

In July 1985, amendments to the Fisheries and Oyster Farms Act, 1935, came into effect allowing for the issue of block fishing licences. A block licence is a fishing licence that also covers the employment of crew to take fish for sale on a boat of which the licence holder has charge. Only the licence holder is authorised to land fish for sale. The block licence initially covered only ocean waters for the otter and seine trawl, and tuna fisheries. In March 1986, an amendment was made to extend the block fishing licence to cover the taking of fish by lines and traps.

LAW ENFORCEMENT

Fines by post

A system of penalty notices (fines by post) for minor offences under the Fisheries and Oyster Farms Act, 1935, and the Regulations was introduced. Its implementation has been well received in the general community and by the commercial fishing industry; so much so that the Association of Professional Fishermen has sought an extension of the system to additional offences.

The Division of Fisheries issues most summonses under legislation administered by the Department (over 3000 a year), and will investigate extending the system to other minor offences. This would relieve the courts of a workload more appropriately dealt with by a penalty notice.

Regulations

Major amendments to the Regulations under the Fisheries and Oyster Farms Act were drafted.

The two major areas reviewed were the 'nets and fishing gear' and 'oyster' regulations, and when the amended regulations are approved, they will provide the Department with improved powers to ensure the future good management of fisheries. They will also enable the 1979 amendments to the Fisheries and Oyster Farms Act to be proclaimed.



Terry Gorman, Senior Biologist, examines a panel of netting with commercial fishers who attended a course on net construction and maintenance. Improved efficiency is the most likely avenue for a more profitable fishing industry and is generated through such educational and advisory programs.

Aerial patrols

Greatly increased use of helicopters and light aircraft for patrol work was undertaken during the year, and proved to be very effective both in actual enforcement and in terms of public relations.

Fisheries Patrol Vessel *Tracker II*

The Division upgraded the equipment on the FPV *Tracker II* to ensure safer operation of the vessel and more effective patrol work.

MARINE RESEARCH AND DEVELOPMENT

MARINE EXPLORATION

The Fisheries Research Vessel *Kapala* was involved mainly in tagging and data collection as the Department's contribution to Fishing Industry Research Trust Account-funded programs on redfish and whiting.

Underwater observation of fishing gear

A cooperative program with the Australian Maritime College and the South Australian Fisheries Department involved underwater observation and filming of commercial trawling gear using video and still film. This was the first time a major exercise of this type had been attempted in Australia. The results, when published, will provide useful information to the fishing industry on the behaviour of some of the more popular types of trawl gear.

Red spot whiting

A project involving tagging red spot whiting (*Sillago bassensis*) between Broken Bay and the Clarence River was a continuation of a program begun in 1984 to estimate fishing mortality and assess movement of whiting. Over 3000 whiting were tagged and released, mostly off the Clarence River where this red spot whiting fishery is centred.

Redfish

For much of the year *Kapala* was also involved in tagging redfish (*Centroberyx affinis*) to determine fishing mortality and migration patterns. By April 1986, almost 9000 redfish had been tagged from *Kapala* between Batemans Bay and Broken Bay.

Gemfish

During July and August, a program to find the gemfish spawning ground was initiated. Gemfish (*Rexea solandri*) is the most important species in the trawl fishery and this program was the first major attempt to locate their spawning area. Gemfish larvae were caught between Crowdy Head and Smoky

Cape, indicating that the gemfish spawning grounds are probably further north than previously thought.

Kapala's operations were interrupted for 3 weeks in late 1985 when she was deployed to search for the remains of an aircraft that had crashed into the sea off Botany Bay.

RESOURCE ASSESSMENT

Trawl fish

Research information collected by the Department on all major trawl fish was summarised and presented to a special stock assessment workshop associated with the introduction of the South East Trawl Management Plan.

Snapper

A study of the NSW snapper (*Chrysophrys auratus*) fishery started. The study is gathering data at Coffs Harbour and Sydney on the biology of the fish and on commercial and recreational catch rates. Over 1000 snapper were tagged, and recaptures have already been made.

Tuna

The yellowfin tuna (*Thunnus albacares*) long-lining fishery expanded rapidly off the NSW South Coast, and the Department started a monitoring program to record total landings and exports. Individual fish are worth up to \$4,000.

Kingfish

A new study on the biology of yellowtail kingfish (*Seriola lalandi*) started. The study will gather biological and catch statistics at important centres of the fishery.

Abalone and scallops

Several years of intensive field work defined growth and mortality rates and identified recruitment patterns. Research tapered off during 1985–86, to monitoring of recruitment levels and catches.

Gamefish

Over 10 000 gamefish were tagged around Australia bringing the total released to date to over 50 000. The thousandth gamefish recapture was recorded this year. A full summary of the program was published in a *Gamefish tagging newsletter*.

Prawn stocks

Clarence River. In 1985 a survey started to investigate the distribution of pre-adult eastern king prawns (*Penaeus plebejus*) on fishing grounds off the Clarence River. The survey will run for 18 months.

Metropolitan estuaries. An investigation into the effects of fishing on prawn stocks in the Hawkesbury River was started following claims by fishers and others that there were too many vessels operating in the fishery. Collection of information on the distribution of prawns, the incidental catch of trawlers, and catch statistics started.

A logbook to collect research and management data from all three metropolitan estuaries (Botany Bay, Sydney Harbour and Hawkesbury River) was introduced.

ENVIRONMENTAL STUDIES

Habitats

In April, an estuarine inventory for NSW was printed. Copies were sent to local government offices as well as other State instrumentalities. The objective was to help in the wise use and conservation of fish habitats. Liaison continued with Public Works Department officers on canal estate design criteria, which may have a beneficial effect on fish habitats. A compilation of all historical data on pesticides and aquatic species was prepared for publication. Comprehensive draft management plans for proposed aquatic reserves at Towra Point, Lord Howe Island and Jervis Bay were compiled. The first was published and widely distributed to encourage comment in relation to the future management of this area.

Fish ecology

The fish communities in two intermittently opening coastal lagoons (Lake Wollumboola and Swan Lake) were investigated. Results to date show good recruitment of juveniles to both lakes, as well as considerable use of them by adult fish, following their opening to

the sea. There are about 50 of these lagoons along the NSW coastline, and this research may have a bearing on how they are managed.

A breeding population of the accidentally introduced oriental goby (*Tridentiger trigonocephalus*) was discovered in the Parramatta River. This and other reports from the Sydney estuary system indicate that both this species and the other, more common, species of introduced oriental goby (*Acanthogobius flavimanus*) are increasing rapidly in both range and numbers in the Sydney area.

AQUACULTURE

Facilities

Final approval was given to build an oyster hatchery at Port Stephens, to cost \$1.91 million. Work started with site preparation and purchase of equipment.

Community Employment Program (CEP) grants totalling nearly \$500,000 were allocated to the Port Stephens Brackish Water Fish Culture Research Station. One major project will be the construction of a visitor centre.

Prawns

The results of the Clarence River pilot prawn farming project were presented to potential farmers and the public at a well attended prawn farming open day at Wollongbar. Research that was complementary to the large-scale farming trials in the project was completed in ponds at Port Stephens. It demonstrated that school prawns (*Metapenaeus macleayi*) can be successfully grown in ponds at a range of high stocking densities, for example 60 juveniles per square metre, when nutritionally adequate supplementary diets are used.

Prospective prawn farmers have shown considerable interest in larger prawn species. In response to this interest, aquarium experiments aimed at determining optimum temperatures for growth of eastern king prawns (*Penaeus plebejus*) and tiger prawns (*Penaeus esculentus*) were started. Results indicate faster growth at temperatures above the optimum for school prawns.

Oysters

A two-year study designed to determine factors affecting the spatfall of Sydney rock oysters in Salamander Bay, Port Stephens, was started. Port Stephens currently supplies

a major percentage of all seed oysters farmed and fattened in NSW.

The spatfall of the introduced Pacific oyster in Port Stephens was monitored. The 1985–86 spatfall was much larger than that of 1984–85. Fortunately, the spatfall of Pacific oyster has so far been mainly in the inner harbour, leaving the Sydney rock oyster spat-catching areas in the outer harbour comparatively free from this introduced species.

An experiment was carried out at the Vales Point Power Station with hatchery-produced spat. Growth rates at the outlet from the power station were better than those at the inlet. This study was the first step towards establishing whether there would be any commercial advantage in using heated effluent from coastal power stations for the nursery culture of hatchery-produced spat in winter.

Research on hatchery techniques for Sydney rock oysters continued at Port Stephens in preparation for the new hatchery. Considering the problems the industry will face because of the Pacific oyster, this hatchery may prove to be particularly important.

HABITAT IMPROVEMENT

Research continued on mangrove and seagrass transplanting to design cost-effective

techniques of rehabilitating degraded habitats and enhancing existing habitats. An inventory of mangrove transplants was produced.

To date there have been 22 mangrove transplanting projects in NSW. The largest of these was on the Hawkesbury River where 1300 trees were planted. In Nowra, a CEP program established a number of experimental plots designed to investigate techniques of improving establishment success and growth rates of transplanted trees.

Seagrass transplant work started in Botany Bay in conjunction with the State Pollution Control Commission and the Maritime Services Board.

SUPPORT SERVICES

A Manager and seven support staff were appointed to the Fisheries Research Institute, Cronulla.

In addition, a Research Director was appointed in 1986. He is Dr Robert Kearney, an Australian-born scientist with extensive international experience in fisheries research and management, particularly international tuna fisheries.

Over \$1 million has been spent on developing the facilities at the Institute, much of it from CEP funding.

INLAND REGULATION AND MANAGEMENT

MANAGEMENT AND LAW ENFORCEMENT

No new management policies related to inland fisheries were implemented, although the problems associated with habitat degradation continued.

There was considerable liaison with the Water Resources Commission in relation to river desnagging works and the suitability of Section 26D of the Water Act for maintenance of important fisheries habitats. The Public Works Department were frequently consulted in relation to construction of dams and weirs on waterways and provision of fish passage facilities.

Following previous research on Murray crayfish (*Euastacus armatus*), a management plan was developed and proposed amendments to the Regulations were forwarded to the Department's legal officers.

A kit of guidelines on freshwater habitat management was developed to increase adoption of sound development practices on inland waterways.

LICENSING

In 1984, the issuing of any new commercial fishing licences for inland waters was prohibited. There were then 163 licence holders. This year 81 licences were issued as renewals.

RESOURCE ASSESSMENT

The development of a freshwater fish database system was a priority throughout 1985–86. The database will provide a standardised data storage and retrieval system for all survey information, historical records and on-going research programs, and supplements the existing fish stocking database. To tie in with these database systems, a set of habitat simulation programs is being developed for modelling habitat-resource relationships and quantifying habitat alteration due to changes in river flow patterns and volumes.

Eucumbene

Compilation of catch data and population structure for the Lake Eucumbene trout fishery highlighted the importance of assessing survival rates of stocked fish. An experimental release of 30 000 fin-clipped rainbow trout was carried out in May 1986 to provide an estimate of the contribution to the catch and spawning population of stocked fish.

Burrinjuck

The Macquarie perch (*Macquaria australasica*) spawning run was successfully trapped in October to enable tagging of potential spawners. Recruitment success was monitored within the Lake this year. The first collections of redfin (*Perca fluviatilis*) in the Murrumbidgee River in April may signal a possible invasion of the lake. This could mean further competition with the threatened Macquarie perch population.

Tallowa

Surveys in Tallowa Dam have indicated Macquarie perch have successfully bred in each of the past three years, although the population appears concentrated in the Kangaroo River arm.

Blowering

Surveys indicated that Murray cod (*Maccullochella peelii*) populations may be reproducing, but there has been no evidence of recruitment in other species. Stocking of bass in Toonumbar and Brogo Dams during 1981 has proved successful with exceptional growth and high returns to anglers this year.

Detailed surveys in the Tuross and Deua

Rivers have been undertaken to determine both the sensitivity of the fish resources to logging operations, and the status of the threatened grayling (*Prototroctes maraena*) populations that were present in the past. No grayling were found. Remnant populations of river blackfish (*Gadopsis marmoratus*) were located in the tributaries of Molong Creek, but appear to have been replaced in the upper reaches by rainbow trout (*Salmo gairdneri*).

Further water sampling in the Tweed River was undertaken to assess the effectiveness of special water releases from Clarrie Hall Dam and the newly constructed fish ladder on Bray Park Weir.

ENVIRONMENTAL STUDIES

Pesticides

The sampling network for pesticide analyses of fish has been expanded throughout inland waterways in conjunction with the Biological and Chemical Research Institute at Rydalmere. A compilation of published and unpublished data on pesticide and polychlorinated biphenyl (PCB) residues in freshwater fish has been prepared.

Sydney area

A study on the effects of sand and gravel extraction in the Hawkesbury River will be completed soon, together with an assessment of the fish resources in the Upper Nepean system.

Fish passage

Further investigations have been undertaken on the licensing conditions for irrigation water uses on the Darling River and the maintenance of fish passage. The Department has also been investigating the need for fish passage structures along the Murray River with the River Murray Commission. Laboratory investigations on the effectiveness of fish passage structures have so far proved successful, providing data on optimum water flow conditions for golden perch, silver perch and Australian bass.

AQUACULTURE

Facilities

The construction of a hatchery building at the Inland Fisheries Research Station, Nar-



Scientific staff from the Inland Fisheries Research Station at Narrandera sampling Murray crayfish habitats. Such research, including tag and release studies, leads to better management of resources. In the case of Murray crayfish, a management plan was based on this research, and regulations to implement the plan were submitted for approval.

randera, was completed in 1985 although final fitting out continued. Investigations on the water supply requirements for the Station continued and the necessity for temperature-controlled high-quality water became more apparent as difficulties were encountered with holding trout cod and Macquarie perch broodstock.

The final fitting out of the new Eastern Freshwater Cod Hatchery at Grafton neared completion and pond stocking trials were successful. Security problems have been encountered at both Grafton and Narrandera this year with attempted removal of valuable broodstock.

Inland fish

Production of golden perch (*Macquaria ambigua*) and silver perch (*Bidyanus bidyanus*) was curtailed in 1985 due to the identification of goldfish ulcer disease in goldfish collected for broodstock feeding.

The initial breeding season for trout cod (*Maccullochella macquariensis*) and Macquarie perch (*Macquaria australasica*) in late 1985 provided assessment of sex ratios and rates of gonad maturation in ponds, and helped to develop fertilisation techniques.

Bass

In 1985, bass (*Macquaria novemaculeata*) production at the Brackish Water Fish Culture Research Station yielded 8000 good quality fingerlings of which 7000 were stocked into Glenbawn Dam and the rest used for rearing trials and stocking of farm dams.

AGRICULTURAL SUPPORT SERVICES

Technical services

Education

Training

Grants for research

Marketing and economic services

Export development

Overseas projects

TECHNICAL SERVICES

MANAGEMENT AND COMPUTING SERVICES

AGNET computer network

The Department's computer network AGNET was fully installed. The network now comprises a Prime 9950 in the McKell Building, a Prime 550 in each region and a Prime 2250 in each of the metropolitan research institutes. Most of the equipment in the network was purchased on a period contract with Prime, which has been extended for a further two years, until February 1988.

AGNET is a private packet-switched network supported by a number of leased Telecom lines, and includes a link to the national packet-switched network AUSTPAC and to the Telex network. This enables all departmental offices to use the facilities of the Prime network. To save money, the Sydney to Lismore link was changed from the older Datel service to Telecom's digital data service (DDS). Further conversions of Datel to DDS leases are expected as DDS becomes available in the more remote locations throughout the State.

AGNET was expanded in a number of areas:

- As part of the planning for program budgeting due to be introduced on 1 July 1986, the disc storage capacity of the Prime 9950 was expanded.
- The capacity of AGNET increased to about 280 Apricot microcomputers (which can be used as terminals) and 70 'dumb' terminals.
- Associated with the increase in terminals was an increase in the use of the office automation system (OAS), which was extended to all Prime computers. All senior management were given facilities to access AGNET and were trained in the use of OAS.
- On a trial basis, the Department extended AGNET to include the facilities of OTC's MINERVA system so that electronic communication can take place with external organisations and overseas databases.
- Two additional support staff were recruited within Computing and Management Services Branch.

- With the closure by Public Works Department of the staffed telex facilities in the McKell Building, a major part of the Department's outgoing and Head Office-incoming telex traffic is now routed via AGNET and the associated telex facilities.

Computer Advisory Committee

The Computer Advisory Committee was formed to provide advice to the Executive on aspects of computing policy. This Committee meets on a quarterly basis and is responsible for ensuring that the Department pursues a cohesive and effective computing policy.

ARCHITECTURE

There was record demand on the Department's architectural services for the documentation of building plans and specifications, and the supervision of works under construction.

The situation was compounded when the Architect was seconded to the Department of Public Works for 12 months to coordinate the preparation of plans and specifications for the laboratory and administration complex at the John Macarthur Agricultural Institute, Camden.

The capital works allocation for 1985-86 was \$6.2 million; to complete a number of major building projects and start new works, and included \$1.8 million for the purchase of plant and for roadworks and cottage maintenance.

Major works completed during the year were:

Advisory office accommodation, North Coast Agricultural Institute, Wollongbar	\$445,000
Chemistry Wing, Biological and Chemical Research Institute, Rydalmere	\$2,176,000
Reroofing laboratories, Biological and Chemical Research Institute, Rydalmere	\$600,000
Laboratory/offices, Horticultural Research and Advisory Station, Gosford	\$1,214,000
Visitor centre and water improvements, Gaden Trout Hatchery, Jindabyne	\$453,000

Visitor centre, Dutton Trout Hatchery, Ebor	\$260,000
Short Course Centre and advisory complex, Yanco Agricultural Institute, Yanco	\$1,700,000
Barley and oat seed storage, Tamworth	\$227,000
Cottage, Tropical Fruit Research Station, Alstonville	\$74,000

The relocation of the Central Veterinary Laboratory from Glenfield to the John Macarthur Agricultural Institute, Camden, will be the largest capital works project to be undertaken by this Department. Documentation of plans and specifications for the total complex were almost completed. Services to the building site started in 1985.

Architectural services were also provided for the building components of the main Community Employment Program projects undertaken by the Department. Buildings completed during the year were the Eastern Freshwater Fish Research Hatchery, Grafton, and tourist buildings at Trangie and Alstonville. Work started on information centres at Wollongbar and Gosford.

A major program to upgrade and improve the safety of old laboratories at the Biological and Chemical Research Institute, Rydalmere, started, and \$1.7 million was provided to complete this work within three years.

PUBLICATIONS AND INFORMATION

The Department is the major producer, gatherer and supplier of agricultural and fisheries information in NSW. A large proportion of this information is provided in printed form, although videos, displays, radio and television are also extensively used to supplement personal talks, interviews and the telephone.

Electronic publishing

Despite great advances in computer and video technology, the more traditional media are, for the near future at least, still the most useful ways to get information to rural and fishing people. High production costs prevent the use of video to its full potential; and low rates of computer ownership and skills in the rural community prevent wider use of computers for direct communication.

The Department does, however, use computers extensively for providing information such as market reports to the commercial media.

Many departmental publications are also being written, revised and transmitted electronically between offices around the State; and planning is well advanced to allow most publications to be typeset directly from an edited computer disc.

Printed publications

Printed research, advisory, regulatory and educational information is supplied to a wide range of audiences in many forms and at many levels. More than 200 items were produced during the year.

The main information series, Agfacts, now covers most areas of information required by the public. Since the introduction of Agfacts in 1981, 900 new titles and 167 revisions have been published, and many have been reprinted. During 1985-86, 244 new and revised Agfacts were delivered; and the wider use of colour, better quality paper and better design were progressively introduced.

Displays

The Department mounted major displays at the Royal Easter Show, Sydney; Agquip, Gunnedah; the Australian National Field Days, Orange; and at many other field days, conferences and country shows.

These professional displays helped make campaigns such as the Conservation Farming Program more visible to the public, and increased their impact.

Associated posters, stickers and brochures also brought many messages to public attention. Posters on acid soils, fireweed and conservation farming; and brochures on the Department's two fish hatcheries and on the European wasp were some of the many produced.

Libraries

The Department is an information seeker as well as a provider. Information required for various purposes may already be in print and, to avoid duplication, staff must first search the world literature.

In the past, libraries have been required to keep large up-to-date collections of all agricultural and fisheries books and journals. Computerisation of library databases, how-



The Department's computer network AGNET enables all departmental officers to use the facilities of the network. These include agricultural databases, an office automation system, electronic communication, telex, budgeting and access to AUSTPAC and MINERVA. Sylvia Yerman, Computer Operator, works at the console of the Department's control computer, a PRIME 9950.

ever, makes searching quicker, more accurate and easier, and has been in progress for some years. In the future there will be no need for individual organisations to keep full collections. Instead, they will keep only small sections of an Australia-wide collection, and access information and document suppliers through computer terminals.

The Department has had a major role in establishing the Australian Bibliography of Agriculture (ABOA) as a major agricultural database, and similar cooperative projects with other State departments have started.

BIOMETRY

The Biometrical Branch is responsible for providing statistical advice to departmental officers who are involved with research, advisory or regulatory programs. This statistical advice usually relates to the selection of appropriate methods for conducting experiments and to data analysis.

Experiments are designed to compare treatments or to estimate response trends. Successful experimentation requires careful planning, choice of treatments, experimental design, layout, application of treatments, recording of site observations and plot results, data analysis, interpretation of results and reporting of conclusions. These phases of the experimental process are most successful when there is close cooperation between the experimenter and the consulting statistician.

Biometricians are located at Head Office and at research stations or institutes throughout the State. They contribute to biological investigations and to some aspects of statistical methodology itself. The availability of good computing facilities should enable advances in statistical computing to be made.

Notes describing the stages of field experimentation have been written for advisory staff from the Divisions of Plant Industries and Animal Production.

Further updates have been made to the computer package REG, which is used to analyse data from experiments and surveys. REG has now been distributed to statisticians in five countries. The 1985 issue of the manual for its use has been well accepted; further updates of this manual will be issued to describe the use of the package for the analysis of data from field experiments where

the analysis method takes account of neighbour relationships among the plots.

Other important advances have been made in:

- The refinement of 'nearest-neighbour' analysis methods for data from small-plot field trials and their implementation in computer programs.
- The development of methods for the analysis of multivariate data observed sequentially over time. These methods will apply to the analysis of series of data from soil cores sampled at various times.
- The reformulation of non-linear response functions that have biological quantities replacing mathematical terms. Improved inferences are available for these new parameters. This is particularly useful when the functional form of response varies between members in a series of trials.

AGRICULTURAL ENGINEERING

Conservation farming technology

Conservation farming technology is currently the main program of the Agricultural Engineering Branch. The program was applied to broadacre cropping and pasture establishment generally, but with special emphasis on improved seeding equipment for handling crop residues, for soybean establishment on sloping fragile country on the North Coast, for potatoes sown into cereal residues (used to control wind erosion on sandy soils in the south-west), and on helping farmers in the more efficient application of chemicals for weed control.

A new project, funded by the Wheat Industry Research Committee NSW, is studying seeding equipment for improved crop establishment under conservation tillage. This multidisciplinary project at Condobolin will use the mobile dynamometer provided under an earlier Federal National Energy Research, Development and Demonstration Program. Another grant from the Wheat Industry Research Council will be used to establish an Australia-wide tillage and trafficability database. Reserve Bank-funded projects on ground-engaging tools and on tractor vertical loading are being completed this year. Key results from these projects are:

- Improved seeder ground-tools that reduce soil disturbance, penetrate trash, minimise smearing and yet have good wearlife are

only possible with exotic share-tip treatments. Non-metallic, ceramic treatments are currently being evaluated.

- Some of the complex factors affecting machine design for ensuring maximum trashflow through seeders and tillage equipment have been determined and the results published.
- Certain tillage implements impose substantial vertical loads onto the tractor drawbar, with undesirable effects on tractor ballast, fuel economy and transmission reliability. These vertical loads were measured and have provided data not previously known, even by the equipment manufacturers. Results are used to advise operators, especially of four-wheel drive tractors, how to ballast their machines to compensate for the additional dynamic loadings imposed by tillage and land-forming implements.

The connection between tractor transmission failures and vertical loading was not as marked as had been expected. This is because of both improved designs and the increased awareness of operators; so reducing the incidence of failures over the past five years.

A new drawbar-integrated 'vector pullmeter' was developed that could be used to monitor and even control load, speed and wheelslip 'on the move'.

MECDEX database

A new database system for recording information about farm equipment manufacturers, suppliers and their products was established. Named MECDEX, the database lists about 1500 suppliers and several thousand products and was first used to prepare computer printouts of this information. It should soon be available to departmental advisers by computer access and eventually by rural videotext or network users.

Computer facilities at the Agricultural Engineering Centre, Glenfield, were upgraded substantially, enabling design and farm advisory services to be expanded.

Energy conservation

Management of electrical demands at departmental offices continued to conserve energy and cut costs. Similar programs were developed to help rural producers with structural designs to conserve energy in intensive live-stock structures and controlled-environment houses for horticultural production.

A second survey of refrigerated milk vats in dairies was completed. Information from the survey will be used in advisory programs for improving efficiency in the milking and handling operations. Savings in the NSW dairy industry of \$750,000 would be possible.

Information from engineering trials showed that correctly fitted tillage implement ground-tools and more accurate control of working depths in broadacre tillage equipment could save \$5 million annually, if widely adopted.

Making hay

Research was undertaken on: steam curing of hay to advance baling date and timeliness of fodder conservation; round baler assessment for baler output; bale density and storage; and double-dumped rectangular haybales to increase package density and shipping loads.

Major field days

Mechanisation advisory displays were held at the major machinery field days throughout the State to help landholders reduce operating costs through more efficient operation of farm equipment. Displays at Agquip, Henty, Murrumbateman, Lismore, Mudgee, Moree and Orange covered electronic monitoring of farming operations, soil aeration and deep ripping, cultivation points for greater sowing efficiency, combine conversions for direct drilling, boom spray markers, stubble handling at harvest and round hay-baler performance. About 140 000 landholders viewed the displays. Many obtained Agfacts, a booklet on conservation farming and other publications.

Grain storage

Engineering support was provided for a Wheat Industry Research Committee (WIRC) project on insect control and grain storage economics. This included improving the design of a rapid screening technique for determining insect infestations in grain samples. A prototype disposable plastic-membrane grain-storage pyramid was assessed. Advisory material was also collected on causes of, and methods for guarding against, failures in conventional steel grain silos.

Soil amelioration

Techniques and field trials were expanded to



Departmental agricultural engineers have used equipment like this to monitor tractor transmission failures and overloading by earthmoving scrapers.

assess dry and water-run application of gypsum for use in irrigation systems to improve pasture establishment and soil properties under irrigation.

A Paraplow and Agrowplow (subsoiling implements) were adapted for the subsoil injection of concentrated suspensions of powdered limestone (to offset soil acidity) and of gypsum (for improving soil structure and acidity). A wide variety of suspending agents were assessed to improve the techniques for applying these low-solubility soil ameliorants.

PESTICIDES

Registrations

The Pesticides Registration Section administers the Pesticides Act, 1978. The Section received and evaluated 321 applications for registration of new products, 341 applications for registration of additional labels and 74 applications for approvals of additional containers for registered pesticides.

Users applied for 146 permits, and 70 pesticide orders to allow off-label uses to be made under the Act.

Extra staff were employed to process outstanding registration applications. All delays have now been rectified and processing times reduced.

In addition, 25 new pesticides and 11 major new uses for products currently available were evaluated in conjunction with the Commonwealth Technical Committee on Agricultural Chemicals.

Amendments to the Pesticides Act

In 1985, amendments were made to the Pesticides Act relating to the extension of controls over the aerial application of pesticides.

Some of these amendments came into force in March 1985, and others will be implemented later in 1986.

Regulations giving effect to some new controls over pesticide use were drafted and will come into force soon.

The Regulations not only provide for licensing of aircraft, operators and pilots, but they also control the use of the chemicals, their application and the areas to be sprayed. The Regulations also require operators to keep accessible records.

Controls over certain pesticides

Organochlorine compounds. Use of products containing aldrin, chlordane, DDT, dieldrin, heptachlor and lindane has been reviewed. Virtually all agricultural uses of these products have been removed. The major remaining use is for the control of termites. Some other urban uses are still allowed. Uses will continue to be phased out as suitable alternative materials become available.

Captan, captafol, folpet. The National Health and Medical Research Council has recommended that use of these chemicals cease as soon as possible.

Registration of all remaining products containing these chemicals was cancelled on 30 June 1986.

Sheep dips containing arsenic. Use of these products is being phased out as suitable alternative materials are now available. Registration of sheep dip products containing arsenic will be cancelled on 31 December 1986.

Inspections

Inspectors under the Pesticides Act inspected about 3800 manufacturers, wholesalers, retailers, users and pest control operators. Five prosecutions were undertaken.

Distribution of information on uses of organochlorine compounds and policing of new controls were major tasks for inspectors. A total of 33 549 schedules detailing allowed uses of organochlorine products were distributed.

During the cotton season, inspectors in New England and the Central West were involved in the education, counselling and monitoring of people using chlordimeform. Six large training sessions, involving 50 or more people, and 22 smaller sessions were held, and 324 people given approval to use chlordimeform.

Advisory Committee to Minister

The Advisory Committee to the Minister for Agriculture and Fisheries on Agricultural and Allied Chemicals has met regularly to consider important pesticide issues.

The Advisory Committee consists of ministerial representatives from most NSW Government Departments, as well as environmental and consumer groups, trade unions, grower organisations, the chemical industry and user organisations.

The Advisory Committee has given particular attention to the uses of, and controls that should be exercised over, the persistent organochlorine compounds aldrin, chlordane, DDT, dieldrin, heptachlor and lindane. The review resulted in the Minister deciding that all agricultural uses, except for a few minor uses, of these compounds be banned. Action is also to be taken to curtail use in domestic premises, except for control of termites and borers.

Other issues considered by the Advisory Committee included the use of chlordimeform in cotton, new legislation to exercise additional control over the application of pesticides by aircraft, attractiveness of snail and slug baits to dogs, the use of captan and captafol, the control of mice in plague proportions, and the report of birth abnormalities in the Coffs Harbour Shire.

ENVIRONMENT AND LAND USE STUDIES

Most of the Department's activities in environment and land use studies are handled by the Pesticides and Environmental Studies Unit, regional research and advisory officers and the Land Use Assessment Group at Parramatta.

Land use

Significant progress was made in implementing the Department's policy on the protection of agricultural land. To achieve this objective, the Department helped prepare a range of local and regional environmental plans under the Environmental Planning and Assessment Act, 1979.

Under guidance from the Department of Environment and Planning, a draft State Environmental Planning Policy on Rural Lands is being prepared to encourage the proper management, development and conservation of natural and man-made resources in rural areas.

The Department also provided advice on agricultural and fisheries matters to the Department of Environment and Planning in the preparation of a Regional Environmental Study for the Macarthur Region, the Draft Regional Environmental Plan for the Hawkesbury River Valley and the Draft Regional Environmental Plan (Botany Bay).

The Department commented on a number of local environmental studies and draft local environmental plans. Regional officers

worked closely with the various local councils to ensure that appropriate provisions, consistent with the Department's new initiatives, were included in the preparation of local environmental plans.

Specific advice was also given to councils on many individual proposals involving the development of agricultural lands.

Environmental impact assessment. The Department, consistent with the requirements of the Environmental Planning and Assessment Act, 1979, commented on proposals that could adversely affect agricultural land. These ranged from designated developments, requiring an Environmental Impact Statement, to a review of environmental factors for government proposals such as water supply schemes, routes for transmission lines, national parks and nature reserves, and mining, as well as specific development proposals referred to the Department by councils.

Several developments were examined and commented on by the Department including: the proposed high-temperature incinerator at Broken Hill; National Highway, Wakefield to Estelville; Coffs Harbour to Koolkhan transmission line; and the Draft Water Plan for the Macquarie Marshes.

Determinations under the Mining Act. Under the Mining Act, 1973, the Director-General of the Department of Agriculture has the statutory responsibility to determine classifications on lands likely to be affected by prospecting and mining.

To determine the land classification, the subject area must be inspected and investigations made to find out if the land was used for cropping or pasture improvement before the mining application.

Mapping program

The Department undertook several agricultural land classification surveys. This is part of an ongoing program to provide all councils with these data to help planners in protecting prime crop and pasture land. Two main methods were used in mapping work: agricultural land classification maps prepared using Landsat false colour images; and field surveys using topographic maps.

Landsat false colour images. Five million hectares have been mapped using this method. Another 2.9 million hectares should be completed in the next 12 months, includ-

ing the Shires of Parkes, Young, Boorowa, Gunnedah, Quirindi, Yass, Gunning and Yarrowlumba.

Field surveys. Land classification maps are prepared by various departmental officers

using topographic maps at appropriate scales such as 1:25 000, 1:50 000 or 1:100 000. These maps are used by the Department and to help in the preparation of local and regional environmental plans.

EDUCATION

C.B. ALEXANDER AGRICULTURAL COLLEGE AND MURRUMBIDGEE COLLEGE OF AGRICULTURE

The Department administers two tertiary colleges—C.B. Alexander Agricultural College at Paterson and Murrumbidgee College of Agriculture at Yanco. The Colleges provide educational programs for the rural community. The main goals are to provide courses for aspiring farmers, and short courses and home-study courses for practising farmers. These goals are achieved through a practical approach to developing competence in farm management and an increase in skills for farm operations.

Consultation with farmer groups

At both Colleges curricula are based on opinion from farmer groups. Farmer commitment to program objectives is achieved by encouraging a two-way flow of information. As well, requests from rural groups on farm financial management are given priority. The consultative approach includes gaining the help of rural groups in marketing short-course activities.

Advisory Councils

Council members are largely drawn from primary industry and are selected because of their wide experience in fields as diverse as agricultural production, farmer organisations, agricultural education and law. The Councils comment on existing programs, suggest new programs and advise on the operation of the Colleges.

At C.B. Alexander College the Council was concerned with several matters, including the introduction of revised Certificate and Advanced Certificate courses, and mixed accommodation on campus.

At Murrumbidgee College considerable attention was given to the operation of the College's expanded off-campus practical work scheme and to possible changes in future course offerings.

Specific curriculum areas

At C.B. Alexander College revised agricultural courses were introduced to emphasise practical training, applied farm management and attitude development. The need for attitude development arose from the insistence of farmer consultative groups that attitudes such as willingness to change, a wish to learn and diligence were fundamental to successful farming.

At Murrumbidgee College a technology component was introduced into the business management course. The computer skills gained here will help students adapt to the increasing complexity of farm technology and management.

At both Colleges emphasis has been placed on farm-skills training. This has been very successful and the programs have attracted considerable interest from other institutions. The purpose of the skills training is to ensure that students are more likely to be employed on leaving college. At Murrumbidgee College the Advisory Council has recommended that students do not receive their certificates unless they are evaluated as being proficient in farm skills.

Home-study courses and short courses

At C.B. Alexander College home-study courses are aimed at practising farmers to help them with farm management. Farmers who are unable to attend courses at the Colleges, either because of time constraints or remoteness, can get course materials by mail. These packages of information are supplemented by local tutorials and residential schools.

Short courses have become a feature of agricultural education at both Colleges. The courses are developed following an expression of need for such information by farmers. Courses can take the form of conferences, workshops, seminars or field days. At C.B. Alexander College a small farms field day attracted great interest from



Agricultural courses at the Department's two tertiary colleges emphasise practical training to develop farm skills. At the C.B. Alexander Agricultural College, Paterson, students get practical experience in horse handling from Bruce Urquhart, past Deputy Principal.

farmers on both small and large holdings.

At Murrumbidgee College farmer education programs are held in farm financial management, irrigation, efficient use of farm chemicals and many other topics. For these programs a range of educational activities are provided, from one-day workshops to longer home-study and residential courses.

Integration with advisory services

Many of the courses developed at the Colleges arise as a result of consultation with advisory officers. Examples are small farms field days, farm business management seminars and summer schools on farming. As well, advisory staff use the college facilities for a wide variety of activities. Advisory staff help with tutorials for the home-study courses.

TRAINING

Ninety-six formal training and development sessions were conducted. These comprised 19 different programs, including stress and time management, communication skills, advanced management, career development workshops, repetitive strain injury awareness, computer familiarisation, induction and stenographic refresher courses.

Almost 1400 staff attended internally coordinated and conducted workshops and seminars.

In association with the Commonwealth Department of Community Services, the Department participated in the Work Therapy Training Scheme, which provided short-term training for three disabled people. The Department also participated in the Aboriginal Tertiary Training Scheme.

The Training and Development Unit provided a career counselling service to both permanent and temporary staff, particularly regarding advice on job seeking and educational studies.

The communication of information to the community is a major function of all departmental professional officers. To assist these officers deliver the information as efficiently and effectively as possible, two communication skills workshops were held. The workshops developed practical skills in public speaking, writing and using the electronic

Enrolments

At C.B. Alexander College enrolments were satisfactory with 69 students enrolled in the Certificate in Agriculture, 41 in the Advanced Certificate in Agriculture and 39 in the Certificate in Dairying. As well, 544 people enrolled in the home-study courses and 7200 attended field days and short courses.

At Murrumbidgee College, numbers were maintained in the Advanced Certificate courses at 31 students. However, the number of enrolments in the Certificate course (37) was disappointing. This decline can be directly attributed to difficult financial situations in some rural areas. However, 48 short courses, seminars and workshops were conducted at the Short Course Centre, involving 1150 practising farmers.

media, and included experienced officers as well as officers-in-training.

More than 40 specific-skills workshops were held around the State for more than 300 professional and technical officers. The workshops provided skills training in topics such as photography, using overhead projectors, public speaking and developing discussion groups.

The Division of Animal Production instituted a major program to improve the staff development and training opportunities for livestock officers.

All livestock advisory officers were interviewed to determine their training needs and suitable opportunities were then provided to most officers to up-date and improve their technical knowledge and skills.

The Australian Wool Corporation funded the Department's 1986 sheep and wool refresher course. The course provided technical training in a number of areas and resulted in the development of advisory programs to help producers more effectively control internal and external parasites and footrot.

Training of professional staff was identified in the recommendations of the 1983 veterinary field services review as a high priority and particular emphasis has been placed on improving management and

technical skills.

Many field veterinary staff attended the International Conference on Preventative Medicine and Animal Production at the University of Melbourne in November. The main theme of the conference dealt with a programmed approach to disease investigations and was of significant benefit to field staff.

Senior veterinary staff in administrative

positions were involved with management skills training at a week-long management workshop held at Orange.

The Department provided support for six officers to undertake studies for the degree of Doctor of Philosophy; three at universities in the USA. Another officer received support for studies towards the degree of Master of Veterinary Studies at the University of Melbourne.

GRANTS FOR RESEARCH

Miscellaneous grants

Miscellaneous grants were awarded from: National Energy Research Development and Demonstration Council (\$20,000), Water Research Foundation of Australia Ltd (\$8,600), Horticulture Stock and Nurseries Act Account (\$28,100), Apple and Pear Research Foundation (\$8,890), Australian Macadamia Society (\$5,730), Processing Tomato Research Committee (\$12,500), Commonwealth Special Research Grant (CSRG) Matching Grants (\$13,600), Australian Centre for International Agricultural Research and donations from marketing boards, special interest groups and private companies.

The total research grants to the Department from non-consolidated revenue sources in 1985-86 exceeded \$5.4 million.

New legislation

As a result of legislation passed by the Commonwealth in January 1985, new Rural Research Councils will replace the Commonwealth Rural Industry Trust Account/Research Committees in 1986-87. Essentially, the *Rural Industries Research Bill* 1985 replaces all previous schemes with a set of uniform provisions. Currently the new arrangements will not apply to research grants for the fishing and wool industries, but similar arrangements apply to the new Australian Meat and Livestock Research and Development Corporation, which has been established for the meat industry.

Non-consolidated revenue research grants

Listed below are the main grants made to the Department to support research in 1985-86.

Commonwealth Rural Industry Trust Accounts:

(The cost is shared equally by producers and the Commonwealth Government)

	\$
Australian Chicken Meat Research Committee	16,423
Australian Dairy Research Committee	47,624
Australian Meat Research Committee	477,817
Australian Pig Industry Research Committee	61,225
Barley Industry Research Committee of NSW	209,193
Barley Industry Research Council	330,206
Cotton Research Committee	259,396
Dried Fruits Research Committee	5,600
Fishing Industry Research Committee	399,509
Honey Research Committee	22,020
Oilseeds Research Committee	110,466
Poultry Research Advisory Committee	40,183
Tobacco Trust Account	38,930
Wheat Industry Research Committee of NSW	881,618
Wheat Industry Research Council	606,035
Wool Research Trust Fund	638,637
	4,144,882

Other major grants:

Commonwealth Special Research Grant (CSRG)	77,298
Rice Research Committee (IREC)	328,370
Rural Credits Development Fund	377,983
Swine Compensation Fund	68,100
	851,751

MARKETING AND ECONOMIC SERVICES

The Division of Marketing and Economic Services provides information for use in policy development and in improving the efficiency of agricultural resource use in NSW. Analyses were undertaken by both the Marketing Services and Economic Services Branches, focussing on problems and opportunities within the agricultural sector, as well as the interrelationships between agriculture and the economy as a whole. Information was provided to a wide range of clients including farmers, policy makers, departmental officers, agribusiness firms, industry organisations, other government departments and authorities, and the general public.

FARM RESOURCES MANAGEMENT PROGRAM

In response to continued economic pressures on farmer viability, the Department initiated a Farm Resources Management Program in early 1986. The program has focussed on providing economic and marketing information, as well as improving the management skills of farmers. Since the start of the program, over 1000 farmers have attended a range of seminars and workshops. The program has helped raise farmer, community and departmental understanding of the current economic environment and its implications for farm planning.

MARKETING SERVICES

The Marketing Services Branch comprises a number of units that provide agricultural statistics, marketing advice and commodity intelligence.

Agricultural statistics

The Central Statistics Unit coordinated the collection, storage and dissemination of agricultural statistics within the Department. The major task of establishing the Department's computerised statistical database was started. Information from the Australian Bureau of Statistics was supplied through AGNET—the Department's computer network. Information was also supplied in hardcopy form (that is, as a computer printout) to a wide range of users throughout the State.

As a further initiative, the Unit developed a computerised news bulletin (CSU NEWS) containing economic, market and statistical information. This information is made available on AGNET for users in the Department and through them to departmental clients.

Marketing advice

The Marketing Unit provided research, advisory and educational services to the agricultural and fishing industries. Research and advisory projects were undertaken in the following areas: the establishment of a state-wide cooperative to market pasture seeds; the marketing of both existing and new dairy products; the market potential for apple juice concentrate; and the market opportunities for composted household waste and sewage. Educational projects included: the development of a training video for producers on computer-aided livestock marketing (CALM); a proposal for an educational program for producer leadership and marketing training; and the presentation of numerous addresses at producer meetings to identify and develop marketing opportunities.

Commodity intelligence

Price reporting and commodity outlook activities were further improved over the last twelve months. Market prices were collected and reported for a range of livestock, crop and horticultural products. Livestock prices were reported from a total of nine cattle, eight sheep and two pig markets.

The outlook for crop and livestock commodities was monitored and the implications of current and emerging issues examined. These issues included the effects on Australian agriculture of the European Economic Community's Common Agricultural Policy and the US Farm Bill.

Market prices were reported through regular radio items and newspaper articles, CSU NEWS, and recorded message facilities, in response to personal inquiries and through electronic data provision services.

ECONOMIC SERVICES

The Economic Services Branch carried out research to improve resource use in NSW agriculture. The research program was wide ranging, with emphasis on policy analysis,

production economics and the provision of farm business management information.

Policy analysis was undertaken to provide briefing material for the Minister and departmental Executive; background papers for the Standing Committee on Agriculture and Australian Agricultural Council; submissions to State and Commonwealth Government inquiries; and policy advice to other government departments, marketing boards, statutory authorities and industry groups.

Analysis was undertaken into aspects of industry structure and performance, as in the effect of industry structure on the price spreads for pigmeat, cost-size relationships in the dairy industry and an economic survey of the oyster industry. A number of pricing and marketing arrangements were investigated. For example, the economics of alternative market milk sourcing strategies, the links between livestock production and meat processing, the effects of livestock industry stabilisation policies, and pricing relationships in the NSW fish markets.

A major research area in resource management was on economic aspects of conservation farming, including minimum tillage, soil acidity and salinity. Research into adjustment for farmers under financial stress included two studies that identified options available to rice and sugar farmers. Animal welfare issues were also considered in a project examining the likely effects on the pig industry of the possible introduction of alternative husbandry practices.

The role of government regulation and funding was considered in a number of industries and areas. These included land tenure, water use and production in irrigation areas, farm inspection for public pest control, and public investment in wheat breeding.

Economic aspects of agricultural production were studied to evaluate changes in enterprises, technology, management and marketing options. This research provided specialist support for the Department's research and advisory services.

The economics of a number of enterprises were examined: for example, first-cross lamb

production and Merino breeding in the Dubbo area; Kangaroo Valley ryegrass production; irrigated forage crops; and the establishment of pome, stone and citrus fruit orchards. Alternative technologies were considered in a range of projects, including the effects of varietal changes on the quality of Australian wheats, the effects of semi-dwarf wheat varieties, the use of minimum tillage and other cultivation practices in north-western NSW, the use of fire and goats for scrub control in the Western Division, the role of multi-purpose tree crops in animal production systems, and the use of on-farm grain storage by farmers. In addition, studies were undertaken into technology adoption, particularly conservation farming techniques, and pasture improvement on the Central and Southern Tablelands of NSW.

A number of management strategies were investigated for farmers. These included irrigation plans for farms in the Gwydir Valley, the control of wiregrass on the Northern Slopes and liming strategies to reduce acid soil problems. Alternative marketing strategies for cotton producers were examined, as was the feasibility of using United States commodity futures contracts for hedging Australian cotton and oilseeds production.

Information on a variety of farm management topics was produced to help farmers make decisions under changing economic circumstances. This information included articles on specific topics, such as taxation and rural finance, as well as information on management methods such as improved record-keeping systems.

To help the effective dissemination of economic and marketing information, as well as research results, regular issues of a range of printed and computerised publications were prepared. These publications included CSU NEWS, *Review of Marketing and Economics*, *Agfacts*, *Commodity Bulletin*, *Agricultural Economics Bulletin*, *Miscellaneous Bulletin*, regional statistics handbooks, regional budget booklets and *State of Agriculture in NSW*.

EXPORT DEVELOPMENT

Horticulture Export Development Council

The Council was established in February 1985 to provide an overview of current and future activities in the NSW horticultural industries, to advise the Minister and the Department on the needs of export industries and to foster a planned approach to exports by various sectors of the horticulture industry. Several other States are now establishing groups similar to the NSW Council.

Export Consultative Group

An Export Consultative Group was formed to increase coordination between the various agricultural industry groups concerned with export. The first area studied was transport, and the Group is particularly concerned with container transport by sea. It is examining operations and work practices for the transport of containers to the wharf and handling at the wharf.

Overseas investigations

In March 1985 the Minister led an agricultural mission to Japan to identify export opportunities. One of the results of the trip was the establishment of a Japan-Australia quarantine consultative group. A high priority has been given to examining plant quarantine requirements for citrus, melons, table grapes, cherries and apples.

The Executive Director of the Export Development Unit, Mr Westbrook Haines, visited Europe in June 1985 to meet major importers. As a result of that initiative, asparagus and cherries are now being exported.

The Unit's Principal Officer (Mr J. Baker) visited Hong Kong, Malaysia and Singapore in August, specifically to examine transport, distribution and servicing, consistency of

supply and consistency of quality. The Unit is now working with industry towards the establishment of a regular container service from the east coast of Australia.

The Minister, Director-General and members of the Unit visited Europe in May to identify opportunities for NSW horticultural products.

Export products

Many agricultural commodities are being assessed for their export potential, and trial shipments of some have already been made. Citrus and Murray Grey cattle are two of the first exports to have been developed.

Citrus. As a result of the Minister's visit to Japan, a trial shipment of 14 containers of Sunraysia oranges were sent to Japan. Other outlets have been established in the UK and Ireland. As a result of these activities, a citrus exporters' group was formed in the MIA and six containers of navel oranges were shipped to Japan in June.

Murray Grey cattle. The Unit and the Australian Murray Grey Society are developing a planned approach for live cattle exports, establishment of the breed in Japan and semen sales. The NSW Government and industry will donate Murray Grey cattle for evaluation under Japanese conditions as part of the sister-state relationship between NSW and the Tokyo Metropolitan Government.

Tokyo exhibition

The Unit participated in the NSW exhibit at the Tokyo Exhibition in October. The Unit's two stands featured NSW agriculture with a special horticultural display.

OVERSEAS PROJECTS

The Section administers and manages agricultural research and development projects; conducts evaluation studies to identify potential projects; and undertakes feasibility studies, planning and design studies and project reviews. These activities involve officers in short-term (up to 3

months) and long-term (1 to 2 years) assignments. The Section also arranges and administers training courses and visits to NSW for official overseas agricultural visitors.

During 1985-86 the Section was involved in activities in Ethiopia on policy analysis,

Thailand, Malaysia, Peoples Republic of China, Philippines, the South Pacific and Papua New Guinea.

Technical areas included: land development and settlement; integrated peasant farming; pasture species evaluation and establishment; dairy and beef cattle improvement; transport, storage and marketing of fruit and vegetables; soil nitrogen fixation; and soil chemistry.

Projects are primarily funded by the Australian Development Assistance Bureau (ADAB), although funds are also advanced by the United Nations Food and Agriculture Organisation (FAO), the Australian Centre for International Agricultural Research (ACIAR) and overseas governments.

In 1985-86 officers were involved in 35 short-term assignments for a total of 21 months and three officers and their families lived overseas on long-term assignments.

ADMINISTRATIVE SUPPORT SERVICES

Support services

SUPPORT SERVICES

OFFICE OF THE MINISTER FOR AGRICULTURE AND FISHERIES

A line linking the Minister's Office in Parliament House to the Department's Prime computer was installed. This link provides the Minister with access to the Department's computer network (AGNET) and allows the Minister and his staff to use the Department's electronic mail service and database systems. It also enables the access of third party data services.

PERSONNEL AND STAFFING SERVICES

A video training package, designed to minimise the occurrence of repetitive strain injury (RSI), was produced in conjunction with the Occupational Health and Safety Service of Sydney Hospital. Twenty-five copies of the video were distributed to government departments and the Public Service Association. The approach taken by the Department to combat RSI has been highly innovative and cost-effective.

The Department's commitment to Equal Employment Opportunity (EEO) was highlighted by the revision of its EEO Management Plan, the completion of the EEO Resurvey Report (where the response rate was 81.1%) and the acceptance by the Ethnic Affairs Commission of the Department's Ethnic Affairs Policy Statement.

Three disabled people were permanently appointed under the Public Service Board's special placement scheme.

Confidential investigation of discrimination complaints and counselling of staff throughout the State were undertaken. Recruitment policies were reexamined to ensure compliance with EEO policies and with the relevant strategies contained in the Department's Equal Employment Opportunity Management Plan.

SPECIAL EMPLOYMENT PROGRAMS

The aim of these projects is to provide employment opportunities for disadvantaged groups, especially in areas of high unemployment. Funding of CEP projects came from the Federal Government (70%) and the State Government (30%).

Community Employment Program (CEP)—Round 3

A third round of CEP projects was approved in December 1985. It provided 640 jobs at a cost of \$7,149,839. The projects include:

	\$
John Macarthur	
Agricultural Institute	799,622
Fisheries Research	
Institute, Cronulla	422,293
Seven projects in the	
Sydney Metropolitan Area	892,777
Eight projects in the	
Parramatta area	720,179
One project in the South	
Sydney area	55,122
Eight projects in the North	
Coast Region	1,336,206
Fourteen projects in the	
Gunnedah Region	1,571,935
Four projects in the Dubbo	
Region	173,690
Ten projects in the Orange	
Region	794,709
Six projects in the Leeton	
Region	363,306
	<u>7,129,839</u>

Youth Employment Scheme

The Department was allocated the following funds under the Youth Employment Scheme (YES):

	\$	Jobs
July 1985	396,994	64
October 1985	396,884	61
February 1986	451,103	82
Aboriginal YES Scheme		
March 1986	65,389	11
Special intake May		
1986	381,461	64

Training and staff support for CEP employees

A key feature of the CEP program continues to be the Department's commitment to a wide range of training activities.

From January 1985 to June 1986, 450 CEP employees were involved in formal training programs that included developing personal skills as well as technical skills.

The strong emphasis on job seeking and communication skills, along with a variety of courses including horticulture, fencing, welding, computers, and third class driver's licences, has resulted in an increase in the people who have subsequently found permanent work.

Technical jobs for women

In November 1984 the Department was allocated \$274,720 to provide 20 women with employment and training. Twelve women are still employed under the scheme. Eight obtained permanent employment inside and outside the Department. In April 1986, the Department was allocated a further \$36,330 to provide three positions for women under the scheme, at Wagga Wagga, Grafton and Rydalmere.

MANAGEMENT AUDIT

The Management Audit and Analysis Branch completed 33 financial, administrative and operational audits. In addition, officers of the Branch conducted five comprehensive reviews to evaluate procedures, investigate issues and make recommendations for operational improvements. These were: a review of procedures of Staff Branch (including Salaries); Amenities Account, C.B. Alexander Agricultural College; review of motor vehicle usage; review of Pastures Protection Board financial statements; and results of the 1985 stocktake.

Specific financial or operational evaluations were carried out for the Agricultural Bureau of NSW and the Rural Youth Organisation.

The concept of regional audits continued during the year, involving the review of basic financial and administrative functions by audit teams from within each region.

INDUSTRIAL RELATIONS

A number of award claims affecting staff of the Department were lodged with the Industrial Registrar during the year. The Public Service Association lodged an application for a new Crown Employees (Scientific Section, Fisheries Division, Department of Agriculture—Relocation Compensation) Award. The

matter was heard before His Honour, Mr Justice Bauer, in the Industrial Commission and is yet to be finalised.

In addition, the Association lodged an application seeking to separate advisory officers from the Scientific Officers Agreement. Negotiations with the Public Service Board and the Association are continuing. Variations were also made to the Crown Employees (Overtime) and Crown Employees (Travelling Compensation) Awards.

Staff of the Industrial Section visited 30 regional establishments during the year and held discussions with staff and management on a variety of industrial issues.

SAFETY AND OCCUPATIONAL HEALTH

A position of Manager, Safety and Occupational Health, was created. The Manager's main role is to develop and implement safety policies and oversee the work of the Safety Officer.

Considerable effort was put into reducing the rising incidence of repetitive strain injury (RSI) throughout the Department. The problems associated with RSI were recognised and a training program prepared. The program was designed to alert supervisors of their responsibility in providing a safe place of work and informing staff of their need to avoid undue stress and prolonged periods of repetitive work. Sixteen RSI awareness programs were conducted throughout the Department. These awareness programs have reduced the incidence of RSI from 34 cases in 1984-85 to eight cases this year. The programs also assisted many sufferers to resume normal full-time duties. A bio-feedback monitor was purchased, which enables the measurement of muscle tension of keyboard operators and other staff likely to suffer RSI. A step-by-step approach is then administered to likely sufferers of RSI on how to relieve and avoid soreness in muscles and tendons that could otherwise lead to RSI.

Officers of the Safety and Occupational Health Unit visited 109 departmental units during the year to conduct safety audits; train staff in fire drill and the use of fire extinguishers; explain to management and staff the significance of the Occupational Health and Safety Act, including the establishment of Workplace Safety Committees; and provide advice on matters relating to the

Department's accident prevention program.

The number of injuries and work-related illnesses were fewer than in previous years.

STAFFING

Salary estimates and expenditure were converted to a program budgeting format in preparation for the changeover to program budgeting in 1986-87.

A progression and employment manual was written and distributed throughout the Department. The manual summarises the progression requirements and employment conditions for departmental staff.

The Department's staff turnover rate of 6% was lower than 90% of other government departments.

Transfer of staff from Water Resources Commission

From 1 July 1986, 65 staff positions from the Water Resources Commission will be transferred to the Department of Agriculture. The staff comprise engineers, engineering assistants, drafting officers, field assistants and clerical support officers.

From the date of transfer, the Department

of Agriculture will be responsible for the provision of all technical advice on irrigation and the supply of water for irrigation, with the exception of the construction of bores and wells.

The transferring staff, together with the Department's existing specialised irrigation staff, will form the core of an Irrigation Management Service (IMS), which will offer a range of integrated services to assist the State's irrigated industries.

NEW SOUTH WALES SERVICE AWARDS

The first recipients in the Department of the New South Wales Service Awards were presented with medallions by the Minister for Agriculture and Fisheries, the Hon. J.R. Hallam, MLC, at a function on 28 August 1985. All recipients of the Award had completed 40 years' service and the Minister congratulated them on their loyal and meritorious service.

SENIOR STAFF CHANGES

Mr B.D. Buffier was appointed to the position of Executive Director (Regulatory Services).

Staff statistics as at 30 June 1986*

	Region†							
	1	2	3	4	5	M	O	Total
Administration	18	17	15	16	16	202	-	284
Plant Industries	45	110	32	52	95	371	-	705
Animal Health & Production	72	146	45	110	77	199	-	649
Agricultural Services	131	269	71	142	259	150	-	1 022
Cattle tick	99	-	-	1	-	-	-	100
Fisheries	19	51	5	24	23	118	17	257
SUBTOTAL	384	593	168	345	470	1 040	17	3 017
TJFW‡	3	1	-	-	3	6	-	13
NESA	-	8	1	3	-	1	-	5
CEP	69	120	7	62	38	77	16	389
YES	10	38	3	10	8	13	2	84
NESA apprentices	2	-	1	-	1	-	8	4
Displaced apprentices	-	1	-	-	2	-	-	-
SUBTOTAL	84	160	12	75	52	97	18	498
Ministerials—BTC§	-	-	-	-	-	-	209	209
Ministerials—PPDC	-	-	-	-	-	-	37	37
SUBTOTAL	-	-	-	-	-	-	246	246
TOTAL	468	753	180	420	522	1 137	281	3 761

* Actual staff numbers employed as at 30 June; there were also 394 vacant positions.

† Region 1: North Coast; Region 2: New England, Hunter and Metropolitan; Region 3: Orana and Far Western; Region 4: Central West, South East and Illawarra; Region 5: Murray and Riverina; M: Metropolitan; O: Other.

‡ TJFW: Technical Jobs for Women; NESA: National Employment Strategy for Aborigines; CEP: Community Employment Program; YES: Youth Employment Scheme.

§ BTC: Board of Tick Control; PPDC: Prickly-Pear Destruction Commission.

Note: these figures are expressed in full-time equivalents.

Mr P.J. Small was appointed to the position of Executive Director (Administration) following the appointment of Mr S.J. Day as Commissioner of the Soil Conservation Service.

Mr C.J. Cashman, formerly Assistant Director (Administration), Department of Sport and Recreation, was appointed Chief Administrative Officer.

Mr M. Casimir was appointed to the position of Director of the Institute, Biological and Chemical Research Institute, following the appointment of Dr A.M. Smith as Deputy Director of the Department of Industrial Development and Decentralisation.

Mr E.J. Corbin was appointed to the position of Regional Director of Agriculture of the New England, Hunter and Metropolitan Region (Region 2), following the appointment of Dr A.N. Smith as the Director-General of the Tasmanian Department of Agriculture.

LEGAL SERVICES

Legislation

The Legal Branch coordinated the preparation of legislation (including amendments to existing statutes), issued summonses for prosecution, and appeared on behalf of the Department in defended cases. Legal officers of the Branch were appointed by the Minister to chair agricultural committees to determine disputes under the Agricultural Holdings Act and also participated in legal training seminars throughout the State and at Head Office.

The following general activities were undertaken under State Acts: summonses issued, 69; proclamations, 68; notifications, 12; gazettal of appointments, orders and miscellaneous notices, 71; Agricultural Holdings Act disputes arbitrated, 5.

Main Acts concerned with regulatory activities

The Department's regulatory activities were carried out under the following main Acts:

Commonwealth Acts. Quarantine Act 1908-73; Export Control Act 1982; Fisheries Act 1952.

State Acts. Agricultural Holdings Act, 1941; Agricultural Scientific Collections Trust Act, 1983; Apiaries Act, 1985; Banana Industry Act, 1969; Biological Control Act, 1985; Canned Fruits Marketing Act, 1979; Cattle Compensation Act, 1951; Chicken Meat Industry Act, 1977; Dairy Industry Act, 1979; Dried Fruits Act, 1939; Egg Industry Act, 1983; Farm Produce Act, 1983; Fisheries and Oyster Farms Act, 1935; Fertilizers Act, 1985; Grain Handling Act, 1954; Horticultural Stock and Nurseries Act, 1969; Marketing of Primary Products Act, 1983; Meat Industry Act, 1978; Noxious Insects Act, 1934; Pastures Protection Act, 1934; Pesticides Act, 1978; Plant Diseases Act, 1924; Potato Growers Licensing Act, 1940; Poultry Processing Act, 1969; Prickly Pear Act, 1924; Registration of Stock Brands Act, 1921; Seeds Act, 1982; Stock (Artificial Insemination) Act, 1948; Stock (Chemical Residues) Act, 1975; Stock Diseases Act, 1923; Stock Foods and Medicines Act, 1940; Swine Compensation Act, 1928; Sydney Farm Produce Market Authority Act, 1968; Tobacco Leaf Stabilisation Act, 1967; Veterinary Surgeons Act, 1923; Wheat Marketing Act, 1984; Wine Grape Processing Industry Act, 1979.

Summary of legislative changes

The following legislation administered by the Department was passed in the Budget and Autumn Sessions of Parliament.

Regulations	Gazetted
Agricultural Holdings Act 1941	1
Apiaries Act 1985	1
Dairy Industry Act 1979	1
Farm Produce Act 1983	2
Fisheries and Oyster Farms Act 1935	13
Horticultural Stock and Nurseries Act 1969	1
Justices Act 1902	1
Meat Industry Act 1978	1
Noxious Insects Act 1934	1
Pastures Protection Act 1934	4
Pesticides Act 1978	2
Stock Diseases Act 1923	2
TOTAL = 30	

Acts	Assented to
Biological Control Act 1985	10.12.85
The Land and Environment Court (Biological Control) Amend- ment Act 1985	10.12.85
Egg Industry (Amendment) Act 1985	15.5.86
Farm Produce (Amendment) Act 1985	18.12.85
Fisheries and Oyster Farms (Amendment) Act 1985	29.11.85
Local Government (Pastures Protection) Amendment Act 1985	3.12.85
Pastures Protection (Amendment) Act 1985	25.11.85
Pastures Protection (Rates) Amendment Act 1985	3.12.85
Prevention of Cruelty to Animals (Prescribed Defences) Amend- ment Act 1986	15.5.86
Prickly Pear (Amendment) Act 1985	3.12.85
Statute Law (Miscellaneous Provisions) Act 1985	18.12.85
Statute Law (Miscellaneous Provisions) Act 1986	1.6.86
Stock (Artificial Breeding) Act 1985	10.12.85
Sydney Farm Produce Marketing Authority (Amendment) Act 1985	25.11.85
Veterinary Surgeons Act 1986	15.5.86
Veterinary Surgeons (Artificial Breeding of Stock) Amendment Act 1985	10.12.85
TOTAL = 16	

Major changes to Acts administered by the Department were as follows:

Apiaries Act, 1985

The Apiaries Act, 1985, repealed the Apiaries Act, 1916, and replaced it with a modern statute. The new Act combines the objectives of promoting the production of honey and preventing the spread of disease in bees. The new Act is more detailed and clarifies powers, functions and responsibilities with the aim of making the law more readily understood by beekeepers, inspectors and members of the public generally. It requires beekeepers, rather than apiaries, to be registered, and provides for a statutory scheme of payment of compensation to owners of hives destroyed because of disease, to replace the previous *ex gratia* payment scheme. It increases inspectors' powers along the lines of those in the Plant Diseases Act, with a view to eradicating and preventing the

spread of disease. It also increases penalties and contains various provisions suitable to a modern regulatory statute.

Biological Control Act, 1985

This Act became law on 30 May 1986 and complements, as well as being substantially the same as, the Commonwealth *Biological Control Act* 1984. This is an important and innovative piece of legislation for the rural industry. It provides an opportunity for equitably assessing proposed biological control activities to ensure that they are, in relation to all parts of Australia, in the public interest. This is achieved by requiring the unanimous approval of all Ministers comprising the Australian Agricultural Council to any biological control program.

Steps have already been taken to declare Paterson's curse (*Echium* species) a target for biological control in NSW and the Australian Capital Territory. Other States and the Northern Territory are in the process of implementing similar action under their legislation.

The Fisheries and Oyster Farms (Noxious Fish) Amendment Act, 1985

This Amendment took effect on 29 November 1985. The amendment extended the noxious fish provisions to the Pacific oyster, and an order declaring the Pacific oyster to be a noxious fish took effect on the same date. This authorises the destruction of the Pacific oyster, an inferior introduced species that competes with the Sydney rock oyster.

Pastures Protection Amendments 1985

Rating. The Pastures Protection (Rates) Amendment Act, 1985, and related amendments came into force on 1 January 1986. The amendments established a new system of rating under the Act for occupiers of ratable land in the 57 Pastures Protection Districts throughout NSW. 'Ratable land' is defined as land that has an area not less than the area prescribed for a Pastures Protection District in which the land is situated, or as land that has a carrying capacity of not less than 50 stock-unit equivalents.

Section 25 of the Act enables Pastures Protection Boards to levy general and animal health rates, including the fixing of a minimum total amount payable. The general rate is payable by all occupiers of ratable land, and the animal health rate is calculated according to the carrying capacity of the rat-

able land concerned. The new system has been introduced to achieve a fairer system of rating.

Recreational activities on Travelling Stock Reserves. Amendments contained in the Pastures Protection (Amendment) Act, 1985, No. 141 allow Travelling Stock Reserves under the control of a Pastures Protection Board to be used for the purpose of any recreational activity prescribed by the regulations or authorised by a Board. The regulations currently allow any person to use the network of Travelling Stock Reserves throughout the eastern and central divisions of the State for walking, horseriding, pick-nicking, fishing, swimming, and pedal cycling without a permit, subject to the provisions of the Act.

Veterinary Surgeons Act, 1986

The Prevention of Cruelty to Animals (Prescribed Defences) Amendment Act, 1986, is related to the Veterinary Surgeons Act, 1986.

The purpose of these Acts is to revise the laws relating to veterinary surgeons by repealing the Veterinary Surgeons Act, 1923, and replacing it with a new Act.

The new Act reconstitutes the Board of Veterinary Surgeons, the Investigating Committee and the Disciplinary Tribunal; provides for additional categories of registration of veterinary surgeons, namely registration on an honorary basis, registration as a specialist, and limited registration for specific purposes; and restricts the right to registration on the basis of an overseas academic award.

The conduct of veterinary surgeons is further regulated by making provision for a code of conduct and by extending the grounds on which disciplinary action may be taken by the Investigating Committee and the Disciplinary Tribunal against a veterinary surgeon. Some of the existing permitted practices (dehorning of animals, mulesing operation, tailing of sheep, castrating of animals, etc.) that may be performed by persons who are not qualified as veterinary surgeons have been limited to certain ages or types of animals. It should be noted that owners or employees of the owner of an animal are not affected by this provision. The Act also increases penalties for offences, and makes other minor changes to the practice of veterinary science.

FARRER MEMORIAL TRUST

FARRER MEMORIAL RESEARCH SCHOLARSHIP FUND

The Farrer Memorial Trust was established under a set of instructions dated 16 October 1911, to perpetuate the memory of William James Farrer, plant breeder, and to provide encouragement and inspiration to those engaged in agricultural science.

The Trust was initially set up to make periodic awards of a scholarship for 'study or research in agricultural problems', but was later amended to include the delivery of an annual oration and presentation of the Farrer Memorial Medal to a distinguished agricultural scientist for service rendered in the fields of research, education or administration.

The Director-General of the NSW Department of Agriculture, Mr G.H. Knowles, is the Chairman of the Trust. The other official Trustees, by virtue of the position they hold, are: Mr G.R. Gregory, Deputy Director-General of the Department; Professor J. Turner, Dean of the Faculty of Agriculture, University of Sydney; and Dr F.G. Swain, Principal, Hawkesbury Agricultural College. The non-official Trustees representing industry are: Mr G. McCorquodale, Executive Director, NSW Flour Millers' Council; Mr H.R.M. Ross, 'Glengarry', Springside, via Orange; and Mr P.E.B. MacInnes, 'Warringa', Dubbo.

The 1985 Farrer Memorial Medal was awarded to Dr Clive Francis, Chief, Division of Plant Production, Western Australian Department of Agriculture. The medal was presented to Dr Francis at a function held at the University of Western Australia on 26 September 1985. Dr Francis then delivered the Farrer Memorial oration entitled 'Conservation of plant genetic resources—a continuing saga'.

Mr Brett Summerell, the 1985 Farrer Memorial Scholar is undertaking research at the University of Sydney for the degree of Doctor of Philosophy. The subject of his research is the effect of physical factors and cultivar type on the decomposition of wheat stubble and its relationship to the survival and ecology of the yellow spot fungus in reduced tillage systems.

A donation of \$1,523.20 from the NSW Flour Millers' Council was also received to meet part of the scholarship allowance expenditure.

TRUSTEES OF THE FARRER MEMORIAL RESEARCH SCHOLARSHIP FUND

Auditor-General's Certificate

The accounts of the Trustees of the Farrer Memorial Research Scholarship Fund for the year ended 31 December 1985 have been audited in accordance with Section 34 of the Public Finance and Audit Act, 1983.

In my opinion, the accompanying balance sheet, income and expenditure account and funds statement, read in conjunction with the notes thereto, comply with Section 41B of the Act and exhibit a true and fair view of the financial position at 31 December 1985, and transactions for the year then ended.

K.J. Robson, FASA CPA
Auditor-General of New South Wales

Sydney
2 April 1986

STATEMENT IN ACCORDANCE WITH SECTION 41B(1)(f) OF THE PUBLIC FINANCE AND AUDIT ACT, 1983

In accordance with the Resolution at the 55th Annual General Meeting we state that:

- the financial statements and notes thereon exhibit a true and fair view of the financial position and transactions for the year ended 31 December 1985
- the financial statements have been prepared in accordance with the provisions of the Act, Regulation and the Treasurer's Directions
- we are not aware of any circumstances which would render any particulars included in the financial statements to be misleading or inaccurate.

G.H. Knowles
Chairman
Farrer Memorial Trust

G.R. Gregory
Trustee

Sydney
2 April 1986

Balance Sheet as at 31 December 1985

	1985	Previous Year
	\$	\$
Capital and Retained Earnings		
Balance as at 1 January 1985	69,022	69,022
Donations Received (Note 2)	<u>26,800</u>	<u>95,822</u>
Retained Earnings		
-Accumulated Funds	<u>27,077</u>	<u>22,667</u>
	<u>122,899</u>	<u>91,689</u>
Represented by		
Investments (Note 3)	107,000	71,700
Current Assets		
-Medal Stocks (at cost)	226	259
-Accrued Interest	3,331	2,577
-Cash at Bank, etc.		
—Commonwealth Savings Bank	724	5,414
—Advance Bank Investment A/c	11,305	11,739
—Advance Bank Passbook A/c	<u>313</u>	<u>-</u>
	<u>122,899</u>	<u>91,689</u>

P. Anquetil
Hon. Secretary
Farrer Memorial Trust
2 April 1986

Income and Expenditure Account as at 31 December 1985

	1985	Previous Year
	\$	\$
Income		
Interest from Investments	12,045	9,144
Interest from Cash at Bank, etc.	956	953
	<u>13,001</u>	<u>10,097</u>
Expenditure		
Cost of Scholarship	6,093	6,442
Oration Expenses	1,322	1,127
Bank Charges	15	9
Advertising and Publicity	1,161	—
	<u>8,591</u>	<u>7,578</u>
Excess of Income over Expenditure	<u>4,410</u>	<u>2,519</u>
	<u>13,001</u>	<u>10,097</u>

Statement of Sources and Applications of Funds as at 31 December 1985

	1985	Previous Year
	\$	\$
Source of Funds		
Funds Flow from Operations		
—Operating Funds Inflows	13,001	10,097
—Less Operating Funds Outflows	<u>8,591</u>	<u>7,578</u>
—Donations Received and Added to Capital Account	<u>26,800</u>	<u>6,000</u>
	<u>31,210</u>	<u>8,519</u>
Application of Funds		
Increase (Decrease) in Working Capital (Note A)	(4,090)	8,519
Increase in Investments	<u>35,300</u>	<u>—</u>
	<u>31,210</u>	<u>8,519</u>
Note A: Change in Working Capital		
Sources of Funds		
—Decrease in Medal Stocks	(33)	(32)
—Increase (Decrease) in Accrued Interest	<u>754</u>	<u>(64)</u>
	721	(96)
Application of Funds		
—Increase (Decrease) in Cash at Bank	<u>(4,811)</u>	<u>8,615</u>
—Net Increase (Decrease) in Working Capital	<u>(4,090)</u>	<u>8,519</u>

Notes to and forming part of the Accounts for the year ending 31 December 1985

1. Summary of Accounting Policies

- a. The accompanying financial statements have been prepared on an accrual basis in accordance with historical cost principles, having regard to current Australian accounting standards.
- b. The financial statements have been prepared in accordance with the requirements of Section 41B(1) of the Public Finance and Audit Act, 1983.
- c. Policies adopted are consistent with those applied in the previous year.
- d. All administration costs (including salary and wages) are met directly from the Consolidated Fund allocation to the Minister for Agriculture and Fisheries. Such costs are estimated to be \$1,700 for the year.
- e. Except that no provision is made for the value of accrued long-service or annual leave, no material amounts were owed to or by the Fund as at 31 December 1985. Long-service leave and annual leave are paid out of Consolidated Fund Appropriations when such leave is taken. There is no superannuation liability as at 31 December 1985.

2. Donations received and added to the Capital Account were:

Wheat Industry Research Committee of NSW		\$4,000
Wheat Marketing (Barring of Claims) Fund		
Transfer of interest	\$2,000	
Transfer of proceeds prior to closure of fund	\$20,800	\$22,800
		<u>\$26,800</u>

- a. A Ministerial decision on 15 May 1973 approved the interest remaining in the Wheat Marketing (Barring of Claims) Fund immediately prior to the close of each financial year being credited to the Capital Account of the Farrer Memorial Research Scholarship Fund.

In keeping with a Treasurer's directive the Wheat Marketing (Barring of Claims) Fund was closed. The Treasurer gave approval, prior to the closure of the Fund, to the transfer of \$30,000 to the Farrer Memorial Research Scholarship Fund. Investments totalling \$20,800 were subsequently transferred and are reflected in the attached accounts. A further \$9,200 was transferred into the Farrer Memorial Research Scholarship Fund on 14 January 1986.

- b. The conditions relating to the donation from the Wheat Industry Research Committee are such that the donation must be expended in the areas of salaries, operating expenses or capital. As there are no salaries paid by the Trust and operating expenses are met from interest received on the investment of capital then the donation is credited to the Capital Account.

3. **Investments** in Public Authorities and Term Deposits are valued at cost and market value and are held to maturity. All investments are quoted on the Sydney Stock Exchange.

	Cost Value	Market Value	Cost Value
	1985		1984
	\$	\$	\$
Australian Resources Development Bank	12,200.00	12,200.00	16,700.00
Commonwealth Development Bank of Australia	25,000.00	25,000.00	25,000.00
NSW Treasury Corporation	13,500.00	13,108.85	8,000.00
Metropolitan Water Sewerage, Drainage Board	3,700.00	3,605.17	3,700.00
State Bank of NSW	19,800.00	18,918.00	2,000.00
Primary Industry Bank of Australia	8,000.00	8,000.00	10,800.00
State Electricity Commission	3,000.00	3,077.10	5,500.00
Advance Bank of Australia	21,800.00	21,800.00	-
	<u>107,000.00</u>	<u>105,709.12</u>	<u>71,700.00</u>

4. There are no fixed assets at 31 December 1985.

FINANCIAL STATEMENTS

Statement by Director-General

Pursuant to Clause 8 of the Public Finance and Audit (Departments) Regulation 1986, I state that:

- (a) The accompanying financial statements have been prepared in accordance with the provisions of the Public Finance and Audit Act 1983, the Public Finance and Audit (Departments) Regulation 1986, and the Treasurer's Directions.
- (b) The statements present fairly the receipts and payments of that part of the Consolidated Fund, and those accounts in the Special Deposits Account operated by the Department.
- (c) There are not any circumstances which would render any particulars included in the financial statements to be misleading or inaccurate.

G. H. Knowles,
Director-General

Auditor-General's Certificate

The books and accounts of the Department of Agriculture for the year ended 30 June 1986 have been audited in accordance with Section 34 of the Public Finance and Audit Act 1983.

In my opinion, subject to the comments made in Note 11 to the financial statements, the accompanying receipts and payments statements, summarised receipts and payments statements, and statement of special deposits account balances read in conjunction with the notes thereto, comply with Section 45E of the Act and are in accordance with the accounts and records of the Department.

K. J. Robson FASA CPA
Auditor-General of New South Wales

Sydney
12 January 1987

Notes to Financial Statements

Note 1 General

- (a) The financial statements of the Department have been prepared on the basis that the transactions of the Public Accounts are reported on a cash basis with the exception of payment for salaries which are reported on an accrual basis.
- (b) The financial details provided in Tables A and B relate to transactions on Consolidated Fund and Special Deposits Accounts and are in agreement with the relevant sections of the Treasurer's Public Accounts.
- (c) The financial data provided in Tables A represent all revenue/expenditure details for each of the votes for which funds were appropriated from the Consolidated Fund. In some instances, where financial details could not be dissected into such votes a separate Table has been prepared.
- (d) A reference in the receipts and payments statements to an 'estimate' figure means:
 - (i) in the case of a special appropriation the amount included in the estimates in respect of that appropriation;
 - (ii) in the case of an annual appropriation the amount appropriated in the relevant Appropriation Act as advised by the Treasury.
- (e) A reference in the receipts and payments statement to an 'actual' figure means the payments actually made by the Department in respect of the item to which it refers with the exception of the payment for salaries which are reported on an accrual basis as per (a) above.

Note 2 Amounts due and unpaid for goods and services received

Total value \$904,475.

The amount shown is an estimate calculated on the basis of actual unpaid vouchers on-hand as at 30 June 1986.

Note 3 Outstanding commitments as at 30 June 1986

	\$'000
Capital Works and Services (Contractual Commitments)	4,069
Goods and Services	1,232
Lease/Hire	nil
	<u>\$5,301</u>

Note 4 Schedule of Repayable Amounts owing on Public Borrowings and other repayable advances

Inland Fisheries Fund—Repayable Advances

- (a) 1968/69 Advance of \$50,600.
Loan period of 30 years @ \$1,686.67 repayable per annum. Balance owing on Capital Debt 30.6.86—\$21,926 (Balance 30.6.85—\$23,613).
- (b) 1971/72 Advance of \$120,000.
Loan period of 30 years @ \$4,000.00 repayable per annum. Balance owing on Capital Debt 30.6.86—\$64,000 (Balance 30.6.85—\$68,000).
Interest paid on above loans \$10,260—1985/86 (\$10,470—1984/85).

Note 5 Schedule of Debts Written Off—Year ended 30 June 1986

The following is a list of debts written off during the year ended 30 June 1986.

Description	Amount
	\$
Seed Testing Fees	40
Artificial Stock Breeding Fees	2,669
Laboratory Testing Charges	5
Overpayment of Salary	207
Emergency Tail Tags	50
Search Fees—Prickly Pear Destruction Act	311
Total	<u>\$3,282*</u>
(*\$17,855—1984/85)	

Note 6 Contingent Amount Payable to Department

Meat Inspection Fees—\$3,721,954. Such fees have been outstanding for many years.

The Department through the State Crown Solicitor's Office has initiated legal action against one firm as a test case to prove the legality of the fees; however, the case has not yet come before the Court.

So as not to jeopardise the Department's legal rights in relation to other debtors, under Section 14 of the Limitation Act 1969, the Department is in the process of referring all debtors to the State Crown Solicitor's Office for initiation of legal action.

Note 7 Salaries and Wages Expenditure

Salaries and Wages Expenditure shown for both 1984-85 and 1985-86, funded from the Consolidation Fund includes the full year's costs. The amount of \$718,265.30 was transferred to Special Deposits Account No. 1140 representing 4/14ths of the salary costs for the pay period commencing 27 June 1986.

Note 8 Capital Works and Services

Details of expenditure on capital works and services are listed on Table A.9.2.

Note 9 Schedule of Uncollected Amounts as at 30 June 1986

Schedule A details all uncollected amounts as at 30 June 1986. Appropriate action is currently being undertaken to ensure full recovery of all debts.

Note 10 Other Services

It is estimated that the cost of Other Services provided and not met from the Department's Budget Allocation, totalled \$9,362,000 in 1985/86.

	1985/86 \$'000
Rent (Based on Rental Accommodation as supplied by P.S.B. Office Accommodation Bureau)	2,778
Payroll Tax	4,278
Government Cleaning Service	1,930
Repairs, Maintenance and Renewals, Public Buildings Fitout, etc.	376
Total	<u>9,362</u>

In addition, the Crown Solicitor's Office has assisted on legal matters and the Government Printing Office located in various Government Office Blocks provide copying facilities. The cost of these services has not been assessed.

Note 11 Special Deposits Accounts

The Department is unable to comply fully with the requirements of Section 3(1)(b)(iii) of the Regulation regarding the recording of receipts and payments under appropriate vote description headings.

The Department operates numerous Special Deposit Accounts all of which are held at the Treasury. Where it has been practicable, financial details for these accounts have been dissected into each of the votes for which funds were appropriated from the Consolidated Fund. In cases where this was not feasible, separate tables have been prepared. The accounting system operated by the Department prior to 1/7/1986 did not facilitate expenditure incurred in Special Deposit Accounts to be recorded on a line item basis. Accordingly, expenditure details for Special Deposit Accounts detailed in the Summarised Receipts And Payments Statement, Table B, are shown separately.

Details of balances for all Special Deposits Accounts as at 30 June 1986 are provided in Table C.

Note 12 Revenue—Consolidated Fund

Revenue banked by the Department into the Consolidation Fund totalled \$13,859,000.

This revenue can be dissected as follows:

(a) Receipts for Services Rendered	\$723,000
Rental of Departmental Cottages and Student Fees for Departmental Agricultural Colleges.	
(b) Fees—General	\$1,609,000
Fees received for registration and licence renewals for the various Statutes administered by the Department.	
(c) Commonwealth Contributions	\$6,116,000
These represent contributions by the Commonwealth Government for work carried out by this Department on their behalf under the provisions of Commonwealth legislation:	
Plant Quarantine Services	\$3,011,000
Commerce (Trade Descriptions) Act	\$1,184,000
Overtime—Export & Import Branch	\$330,000
Animal Quarantine Services	\$922,000
Animal Export Services	\$214,000
CSIRO Cotton Research	\$60,000
Commonwealth Fisheries	\$395,000

(d) Fees—Miscellaneous Services Rendered	\$2,308,000
Moneys received for Departmental services rendered.	
(e) Miscellaneous Receipts	\$2,732,000
(f) Administration Charges	\$371,000
Reimbursement of costs incurred in the administration of various programs not funded through the Consolidated Fund.	

Note 13 Audit Fees

The fee for auditing the Department of Agriculture for the year ended 30 June 1986 was \$75,000 (first year audit fees paid) payable to the Treasury of NSW. The Auditor received no other benefits.

Note 14 Special Deposit Account Balances held and inactive for more than 2 years

Account Description	Amount \$	Particulars
Donation by H. J. Bate—Drought Research Trust Fund	500.00	Relevant action to be initiated to clear account
Contributions by Leeton and Mirrool Association towards Red Scale research	229.50	"
Contributions by Kippers Aust P/L—Mushrooms Research, Casings	538.00	"
Donation by IREC—Salary Expenses	1,024.67	"
Grant Poultry Industry—Golf Day	405.00	"
Donations Australian Cotton Growers—Pest Management Project	782.85	"
Weeds—Working Account	468.67	"
Electricity Commission of NSW Survey Power Site—Tuggerah	978.59	"
Electricity Commission of NSW Survey Power Site—Mt Piper	1,517.80	"
Electricity Commission of NSW Survey Power Site—Olney	1,807.03	"
Electricity Commission of NSW Survey Power Site—Apsley	1,908.93	"
Electricity Commission of NSW Survey Power Site—Foybrook	1,378.47	"
Short Course—May 1979 Agriculture Remote Sensing	778.75	"
Course 2—Advisory Appraisal Group	95.00	"
Course 16—Bankers Seminar on Primary Industry May/April 1984	288.73	"
Oyster Lease Stamp Duty Suspense—Gunnedah Region	1,469.84	"

Note 15 Significant variation between Appropriation and Estimates, and Actual Results

1. Administration

Payments—Other Services: 1985/86 Appropriation \$496,000; Actual Expenditure \$676,000

Increase in expenditure due to the following factors:

- (a) Overseas Visits (Appropriation \$35,000; Actual Expenditure \$135,000).
Initial appropriation of \$35,000 represented a nominal amount of expenditure under this item. New commitments in respect of overseas visits arose during the year, and such commitments were approved by the Premier, together with supplementation of funds.
- (b) Homebush Abattoir Corporation Review (Appropriation \$nil; Actual Expenditure \$92,000).
Cost of engaging a consultant to inquire into the viability of constructing and operating a new abattoir at Homebush in accordance with Cabinet decision of 21.10.85.
- (c) Acquisition of Land (Appropriation \$nil; Actual Expenditure \$40,000).
Cost of commitments associated with the acquisition of land for the relocation of Travelling Stock Routes. Costs unforeseen in Budget estimates.

2. Plant Industries

Receipts—Fees—Miscellaneous Services: 1984/85 Actual \$294,000; 1985/86 Actual \$207,000.

Reduced Revenue receipts due to:

- (i) Inspection fees under Plant Diseases Act by \$82,000—reduction in inspection of crops forwarded to markets for sale. Decrease in service attributed to short-term reduction in qualified personnel to perform inspections.
- (ii) Seed Certification Testing by \$10,000—reduction in activity within forming community due to economic and climatic conditions, hence an overall reduction in this service being undertaken.

3. Agricultural Support Services

- (a) Receipts—Sale of Farm Produce: 1984/85 Actual \$1,229,000; 1985/86 Estimate \$1,290,000; 1985/86 Actual \$1,143,000.

Variations between 1984/85 Actual and 1985/86 Estimate, as against 1985/86 Actual was due to the following conditions:

- (i) General downturn in market prices
- (ii) Drought conditions within the State which affected crop yields
- (iii) Hail damage of crops in Orange and surrounding areas.

- (b) Receipts—Reimbursement—Administration Costs: 1984/85 Actual \$92,000; 1985/86 Estimate \$20,000; 1985/86 Actual \$8,000.

Reduced revenue receipts due to:

- (i) Completion of several Australian Development Assistance Bureau (ADAB) projects;
- (ii) NSW—China Co-operative Agricultural Projects—reduction in reimbursement of costs for purchases made on behalf of Chinese Government.
- (c) Payments—Other Services: 1984/85 Actual \$239,000; 1985/86 Appropriation \$226,000; 1985/86 Actual \$411,000.
Variation between 1984/85 Actual and 1985/86 appropriation, as against 1985/86 Actual mainly due to Premier's approval for the extension of the NSW—China Co-operative Agricultural Projects, viz. Guangdong Province Beef Cattle Project, Lechang, Amounting to \$153,000.

4. Animal Health and Production

Receipts—Reimbursement—Administration Costs: 1984/85 Actual \$373,000; 1985/86 Actual \$217,000.

Reduction in revenue due to the gradual winding down of the Commonwealth Government funded TB&B Eradication Campaign within NSW.

5. Cattle Tick Control

Payments—Other Services: 1984/85 Actual \$73,000; 1985/86 Actual \$204,000.

Increase in expenditure due to costs associated with the relocation of the Cattle Quarantine Inspection Gates at Tweed Heads, resulting from the Department of Main Roads resiting of the highway.

6. Fisheries

Receipts—Admission Fees—Trout Hatcheries: 1984/85 Actual \$22,000; 1985/86 Actual \$1,000.

Administration and funding of Trout Hatcheries is undertaken through the Special Deposits Account—Inland Fisheries Fund. Effective during 1985/86 approval was granted for revenue receipts for admission fees to hatcheries being transferred to form part of the receipts of the Inland Fisheries Fund.

Schedule A—Schedule of Uncollected Amounts as at 30.6.1986

Classification	30 days	60 days	90 days and over	Total
	(\$)	(\$)	(\$)	(\$)
Laboratory Testing Charges	20,795	7,154	6,743	34,592
Graham Park Breeding Services—Breeding Fees	42,058	4,608	21,135	67,801
Board of Tick Control—Overtime Charges	1,751	204	837	2,792
Recoupment of Court Costs	282	—	—	282
Board of Tick Control—Dipping Fees	5,784	—	—	5,784
Recoupment of Overtime Costs from Commonwealth	28,729	—	—	28,729
Recoupment of Costs—Under Section 18A Plant Diseases Act	7,766	8,262	12,481	28,509
Prickly-Pear Eradication Service Charges	5,324	450	5,672	11,446
Recoupment of Private Telephone Charges on Departmental Cottages	3,713	—	—	3,713
Sale of Farm Produce	16,435	2,989	1,287	20,711
Sale of Cotton on Consignment	—	—	—	39,120
Sale of Wool on Consignment	—	—	—	16,000
Herd Recording Fees	4,476	4,503	1,127	10,106
Seed Certification Fees	21,391	2,662	2,733	26,786
Student Board and Lodging Fees	45,855	—	2,525	48,380
Recovery of Overpayments for Drought Relief Scheme	—	—	12,409	12,409
Recovery of Employers Liability for Superannuation	3,424	308	3,320	7,052
Sale of Publications	156	468	32	656
Miscellaneous Fees	9,255	44,979	154,923	209,157
Oyster Lease Fees	—	—	8,953	8,953
Total				582,978

Table A.1 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Administration Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total			
	1984/85		1985/86	1984/85		1985/86	1984/85		1985/86	1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	
CONSOLIDATED FUND													
Receipts													
Reimbursement of costs													
Livestock Market Reporting Service	149	150	128	—	—	—	0	0	0	149	150	128	
Total	149	150	128	—	—	—	0	0	0	149	150	128	
Payments													
Salaries and other employee payments ⁷	7,297	7,795	8,219	—	—	—	0	0	0	7,297	7,795	8,219	
Maintenance and working expenses	3,471	3,872	3,572	—	—	—	0	0	0	3,471	3,872	3,572	
Plant and equipment	0	0	0	—	—	—	0	0	0	0	0	0	
Grants and subsidies	99	95	94	—	—	—	0	0	0	99	95	94	
Other services	673	496	676	—	—	—	0	0	0	673	496	676	
Total	11,540	12,258	12,561	—	—	—	0	0	0	11,540	12,258	12,561	
SPECIAL DEPOSITS ACCOUNTS													
Receipts													
Balance of Salaries	0	0	0	0	0	0	58	0	84	58	0	84	
Total	0	0	0	0	0	0	58	0	84	58	0	84	
Payments													
Salaries and other employee payments	0	0	0	0	0	0	36	0	58	36	0	58	
Total	0	0	0	0	0	0	36	0	58	36	0	58	
ALL FUNDS TOTAL RECEIPTS	149	150	128	0	0	0	58	0	84	207	150	212	
ALL FUNDS TOTAL PAYMENTS	11,540	12,258	12,561	0	0	0	36	0	58	11,576	12,258	12,619	

Consolidated Fund Estimates are not Audited by Auditor-General.

Supplementation of Administration Appropriation Funds approved by the Treasury was:

Salary and Payments in the Nature of Salary	\$
A1. Salaries, Wages and Allowances	200,000
A2. Payments for Leave on Retirement, Resignation, etc.	265,000
Other Services	
E1. Overseas Visits	99,830
E. Acquisition of Land for Relocation of Travelling Stock Reserves	39,643
E. Homebush Abattoir Corporation Review—Expenses	92,000
	<u>696,473</u>

Table A.2 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Plant Industries Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000
CONSOLIDATED FUND												
Receipts												
Fees—General	20	30	32	—	—	—	0	0	0	20	30	32
Fees—Miscellaneous Services	248	294	207	—	—	—	0	0	0	248	294	207
Reimbursement—Administration Costs	3	3	3	—	—	—	0	0	0	3	3	3
Commonwealth Contributions												
Plant Quarantine Service	2,780	2,855	3,011	—	—	—	0	0	0	2,780	2,855	3,011
Commerce (Trade Descriptions) Act	799	1,000	1,184	—	—	—	0	0	0	799	1,000	1,184
Overtime—Export & Import Branch	320	312	330	—	—	—	0	0	0	320	312	330
Total	4,170	4,494	4,767	—	—	—	0	0	0	4,170	4,494	4,767
Payments												
Salaries and other employee payments ⁷	15,481	16,433	16,476	—	—	—	0	0	0	15,481	16,433	16,476
Maintenance and working expenses	1,675	1,793	1,846	—	—	—	0	0	0	1,675	1,793	1,846
Plant and equipment	0	0	0	—	—	—	0	0	0	0	0	0
Grants and subsidies	2,523	2,522	2,507	—	—	—	0	0	0	2,523	2,522	2,507
Other services	5,592	5,881	5,927	—	—	—	0	0	0	5,592	5,881	5,927
Total	25,271	26,629	26,756	—	—	—	0	0	0	25,271	26,629	26,756
SPECIAL DEPOSITS ACCOUNTS												
Receipts												
Consolidated Fund—Grant	0	0	0	1,290	0	1,322	0	0	0	1,290	0	1,322
Special Statutes Appropriation	0	0	0	60	0	60	0	0	0	60	0	60
Special Supplementation	0	0	0	50	0	0	0	0	0	50	0	0
Search Fees	0	0	0	22	0	18	0	0	0	22	0	18
Prickly Pear Control Work—Charges	0	0	0	41	0	89	0	0	0	41	0	89
Sale of Equipment and Plant	0	0	0	85	0	191	0	0	0	85	0	191
Interest on Investments	0	0	0	3	0	4	0	0	0	3	0	4
Miscellaneous	0	0	0	17	0	3	0	0	0	17	0	3
Balance of Salaries	0	0	0	0	0	0	142	0	199	142	0	199
Total	0	0	0	1,568	0	1,687	142	0	199	1,710	0	1,886
Payments												
Salaries and other employee payments	0	0	0	908	0	963	82	0	142	990	0	1,105
Maintenance and working expenses	0	0	0	527	0	532	0	0	0	527	0	532
Plant and equipment	0	0	0	87	0	275	0	0	0	87	0	275
Other services	0	0	0	9	0	0	0	0	0	9	0	0
Total	0	0	0	1,531	0	1,770	82	0	142	1,613	0	1,912
ALL FUNDS TOTAL RECEIPTS	4,170	4,494	4,767	1,568	0	1,687	142	0	199	5,880	4,494	6,653
ALL FUNDS TOTAL PAYMENTS	25,271	26,629	26,756	1,531	0	1,770	82	0	142	26,884	26,629	28,668

Consolidated Fund Receipts Estimates are not Audited by Auditor-General.

Supplementation of Plant Industries Appropriation Funds approved by the Treasury was:

Salary and Payments in the Nature of Salary

	\$
A1. Salaries, Wages and Allowances	49,906
Maintenance and Working Expenses	
B3. Travelling Removal and Subsistence Expenses	13,109
B4. Fees for Services Rendered	40,204
B4. Stores, Provisions, Furniture, Equipment, Minor Plant, etc. (including Maintenance and Repairs)	687
Other Services	
E10. Commerce (Trade Descriptions) Act—Expenses	48,132
E11. Plant Quarantine—Expenses	10,739
	<u>162,777</u>

Table A.3 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Agricultural Support Services Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000
CONSOLIDATED FUND												
Receipts												
Receipts for Services Rendered												
Rents	134	138	154	—	—	—	0	0	0	134	138	154
Students Fees	435	542	558	—	—	—	0	0	0	435	542	558
Sale of Government Property	1	30	59	—	—	—	0	0	0	1	30	59
Fees—General	122	174	187	—	—	—	0	0	0	122	174	187
Sales of Farm Produce	1,229	1,290	1,143	—	—	—	0	0	0	1,229	1,290	1,143
Sales of Publications	117	123	144	—	—	—	0	0	0	117	123	144
Reimbursement—Administration Costs	92	20	8	—	—	—	0	0	0	92	20	8
Commonwealth Contribution CSIRO Cotton Research	59	60	60	—	—	—	0	0	0	59	60	60
Total	2,189	2,377	2,313	—	—	—	0	0	0	2,189	2,377	2,313
Payments												
Salaries and other employee payments ⁷	20,440	20,973	21,480	—	—	—	0	0	0	20,440	20,973	21,480
Maintenance and working expenses	11,200	11,996	11,638	—	—	—	0	0	0	11,200	11,996	11,638
Plant and equipment	125	137	133	—	—	—	0	0	0	125	137	133
Grants and subsidies	5	5	5	—	—	—	0	0	0	5	5	5
Other services	239	226	411	—	—	—	0	0	0	239	226	411
Total	32,009	33,337	33,667	—	—	—	0	0	0	32,009	33,337	33,667
SPECIAL DEPOSITS ACCOUNTS												
Receipts												
Commonwealth Grants	0	0	0	27	0	32	0	0	0	27	0	32
Sale of Motor Vehicles	0	0	0	6	0	5	0	0	0	6	0	5
Rental of Cottages	0	0	0	2	0	0	0	0	0	2	0	0
Balance of Salaries	0	0	0	0	0	0	155	0	213	155	0	213
Total	0	0	0	35	0	37	155	0	213	190	0	250
Payments												
Salaries and other employee payments	0	0	0	20	0	21	99	0	155	119	0	176
Maintenance and working expenses	0	0	0	9	0	7	0	0	0	9	0	7
Plant and equipment	0	0	0	0	0	8	0	0	0	0	0	8
Other services	0	0	0	2	0	8	0	0	0	2	0	8
Total	0	0	0	31	0	44	99	0	155	130	0	199
ALL FUNDS TOTAL RECEIPTS	2,189	2,377	2,313	35	0	37	155	0	213	2,379	2,377	2,563
ALL FUNDS TOTAL PAYMENTS	32,009	33,337	33,667	31	0	44	99	0	155	32,139	33,337	33,866

Consolidated Fund Receipts Estimates are not Audited By Auditor-General.

Supplementation of Agricultural Support Services Appropriation Funds Approved by the Treasury was:
Salaries and Payments in the nature of Salary

	\$
A1. Salaries, Wages and Allowances	380,000
A2. Payments for Leave on Retirement, Resignations, etc.	175,000
Other Services	
E2. States Grant (T.E.A.) Act—Expenses	39,500
E4. NSW—China Co-operative Agricultural Projects	179,900
	774,400

Table A.4 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Animal Health and Production Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000
CONSOLIDATED FUND												
Receipts												
Fees—General	749	696	713	—	—	—	0	0	0	749	696	713
Fees—Miscellaneous Services	1,529	1,702	1,705	—	—	—	0	0	0	1,529	1,702	1,705
Sale of Government Property	39	46	118	—	—	—	0	0	0	39	46	118
Reimbursement—Administration Costs	373	261	232	—	—	—	0	0	0	373	261	232
Commonwealth Contribution												
Animal Quarantine Service	936	928	922	—	—	—	0	0	0	936	928	922
Animal Export Service	200	200	214	—	—	—	0	0	0	200	200	214
Total	3,826	3,833	3,904	—	—	—	0	0	0	3,826	3,833	3,904
Payments												
Salaries and other employee payments ²	12,319	12,476	12,722	—	—	—	0	0	0	12,319	12,476	12,722
Maintenance and working expenses	2,022	2,158	2,143	—	—	—	0	0	0	2,022	2,158	2,143
Plant and equipment	0	0	0	—	—	—	0	0	0	0	0	0
Grants and subsidies	73	49	53	—	—	—	0	0	0	73	49	53
Other services	6,078	4,212	4,453	—	—	—	0	0	0	6,078	4,212	4,453
Total	20,492	18,895	19,371	—	—	—	0	0	0	20,492	18,895	19,371
SPECIAL DEPOSITS ACCOUNTS												
Receipts												
Grants—State Contributions	0	0	0	2,400	0	2,114	0	0	0	2,400	0	2,114
Grants—Commonwealth Contributions	0	0	0	6,464	0	5,106	0	0	0	6,464	0	5,106
Lévis (Noxious Insects)	0	0	0	1,093	0	1,304	0	0	0	1,093	0	1,304
Sale of Assets	0	0	0	466	0	433	0	0	0	466	0	433
Stamp Duty (Cattle Comp. Fund)	0	0	0	134	0	164	0	0	0	134	0	164
Refund of Overpayments	0	0	0	13	0	6	0	0	0	13	0	6
Interest	0	0	0	430	0	413	0	0	0	430	0	413
Fees for Services Rendered	0	0	0	3	0	11	0	0	0	3	0	11
Balance of Salaries	0	0	0	0	0	0	107	0	137	107	0	137
Total	0	0	0	11,003	0	9,551	107	0	137	11,110	0	9,688
Payments												
Salaries and other employee payments	0	0	0	6,376	0	5,433	72	0	107	6,448	0	5,540
Maintenance and working expenses	0	0	0	2,629	0	1,813	0	0	0	2,629	0	1,813
Plant and equipment	0	0	0	707	0	283	0	0	0	707	0	283
Grants and subsidies	0	0	0	1,387	0	576	0	0	0	1,387	0	576
Capital Works and Services	0	0	0	205	0	39	0	0	0	205	0	39
Compensation Payments	0	0	0	738	0	314	0	0	0	738	0	314
Other Services	0	0	0	142	0	0	0	0	0	142	0	0
Total	0	0	0	12,184	0	8,458	72	0	107	12,256	0	8,565
ALL FUNDS TOTAL RECEIPTS	3,826	3,833	3,904	11,003	0	9,551	107	0	137	14,936	3,833	13,592
ALL FUNDS TOTAL PAYMENTS	20,492	18,895	19,371	12,184	0	8,458	72	0	107	32,748	18,895	27,936

Consolidated Fund Receipts Estimates are not Audited by Auditor-General.

Supplementation of Animal Health and Production Appropriation Funds approved by the Treasury was:

Salaries and Payments in the Nature of Salary

A2. Payments for Leave on Retirement, Resignation, etc.	\$ 443,000
Grants and Subsidies	
D1. Pasture Protection Boards	4,200
Other Services	
E10. Avian Influenza (Fowl Plague) Outbreak—Victoria, May 1985	481,709
	<u>928,909</u>

Table A.5 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Cattle Tick Control Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000
CONSOLIDATED FUND												
Receipts												
Sale of Government Property	36	55	48	—	—	—	0	0	0	36	55	48
Fees—Miscellaneous Services	22	27	45	—	—	—	0	0	0	22	27	45
Dipping Fees	58	82	93	—	—	—	0	0	0	58	82	93
Total	116	164	186	—	—	—	0	0	0	116	164	186
Payments												
Salaries and other employee payments ⁷	6,401	6,150	6,229	—	—	—	0	0	0	6,401	6,150	6,229
Maintenance and working expenses	3,592	2,955	3,157	—	—	—	0	0	0	3,592	2,955	3,157
Plant and equipment	88	95	95	—	—	—	0	0	0	88	95	95
Grants and subsidies	0	0	0	—	—	—	0	0	0	0	0	0
Other services	73	210	204	—	—	—	0	0	0	73	210	204
Total	10,154	9,410	9,685	—	—	—	0	0	0	10,154	9,410	9,685
SPECIAL DEPOSITS ACCOUNTS												
Receipts												
Balance of Salaries	0	0	0	0	0	0	45	0	55	45	0	55
Total	0	0	0	0	0	0	45	0	55	45	0	55
Payments												
Salaries and other employee payments	0	0	0	0	0	0	34	0	45	34	0	45
Total	0	0	0	0	0	0	34	0	45	34	0	45
ALL FUNDS TOTAL RECEIPTS	58	82	93	0	0	0	45	0	55	103	82	148
ALL FUNDS TOTAL PAYMENTS	10,154	9,410	9,685	0	0	0	34	0	45	10,188	9,410	9,730

Consolidated Fund Receipts Estimates are not Audited By Auditor-General.

Supplementation of Cattle Tick Control Appropriation Funds approved by the Treasury was:

Salaries and Payments in the nature of salary

	\$
A1. Salaries, Wages and Allowances	70,000
A2. Payments for Leave on Retirement, Resignation, etc.	72,000
A3. Overtime	1,000
Maintenance and Working Expenses	
B1. Payroll Tax	5,000
B2. Rent	25,000
Payment of Rates, Charges	1,000
Maintenance, Alterations, Additions and Renewals	5,000
B3. Travelling, Removal and Subsistence Expenses	23,000
Motor Vehicles Running Costs, Maintenance, Hire and Insurance	8,000
B4. Postal and Telephone Expenses	5,000
Stores, Provisions, Furniture, Equipment, Minor plant, etc. (including Maintenance and Repairs)	128,000
Printing	3,000
	<u>346,000</u>

Table A.6 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Fisheries Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate
	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
CONSOLIDATED FUND												
Receipts												
General Miscellaneous Receipts												
Rents	10	10	11	—	—	—	0	0	0	10	10	11
Inspection of Imported Fish	1	1	1	—	—	—	0	0	0	1	1	1
Fish Sorting Fees	3	2	2	—	—	—	0	0	0	3	2	2
Admission Fees—Trout Hatcheries	22	1	1	—	—	—	0	0	0	22	1	1
Fisheries & Oyster Farms Act	636	645	677	—	—	—	0	0	0	636	645	677
Oyster Lease Signs	10	15	7	—	—	—	0	0	0	10	15	7
Oyster Lease Documents—Stamp Duty	0	0	1	—	—	—	0	0	0	0	0	1
Sales of Publications	1	1	1	—	—	—	0	0	0	1	1	1
Fines and Forfeitures	9	5	5	—	—	—	0	0	0	9	5	5
Commonwealth Contribution	302	316	395	—	—	—	0	0	0	302	316	395
Total	994	996	1,101	—	—	—	0	0	0	994	996	1,101
Payments												
Salaries and other employee payments ⁷	2,605	2,785	2,713	—	—	—	0	0	0	2,605	2,785	2,713
Maintenance and working expenses	1,136	1,213	1,174	—	—	—	0	0	0	1,136	1,213	1,174
Plant and equipment	169	129	125	—	—	—	0	0	0	169	129	125
Other services	4,643	4,748	4,738	—	—	—	0	0	0	4,643	4,748	4,738
Total	8,553	8,875	8,750	—	—	—	0	0	0	8,553	8,875	8,750
SPECIAL DEPOSITS ACCOUNTS												
Receipts												
Consolidated Fund—Grant	0	0	0	4,394	0	4,493	0	0	0	4,394	0	4,493
Commonwealth and Other Grants	0	0	0	36	0	15	0	0	0	36	0	15
Sale of Fisheries Licences	0	0	0	985	0	1,175	0	0	0	985	0	1,175
Sale of Fish	0	0	0	24	0	18	0	0	0	24	0	18
Sale of Equipment	0	0	0	78	0	69	0	0	0	78	0	69
Miscellaneous Receipts	0	0	0	35	0	58	0	0	0	35	0	58
Balance of Salaries	0	0	0	0	0	0	21	0	30	21	0	30
Total	0	0	0	5,552	0	5,828	21	0	30	5,573	0	5,858
Payments												
Salaries and other employee payments	0	0	0	2,830	0	3,237	11	0	21	2,841	0	3,258
Maintenance and working expenses	0	0	0	1,845	0	2,260	0	0	0	1,845	0	2,260
Plant and equipment	0	0	0	467	0	633	0	0	0	467	0	633
Grants and Subsidies	0	0	0	0	0	81	0	0	0	0	0	81
Other services	0	0	0	70	0	83	0	0	0	70	0	83
Total	0	0	0	5,212	0	6,294	11	0	21	5,223	0	6,315
ALL FUNDS TOTAL RECEIPTS	994	996	1,101	5,552	0	5,828	21	0	30	6,567	996	6,959
ALL FUNDS TOTAL PAYMENTS	8,553	8,875	8,750	5,212	0	6,294	11	0	21	13,776	8,875	15,065

Consolidated Fund Receipts Estimates are not Audited By Auditor-General.

Supplementation of Fisheries Appropriation Funds approved by the Treasury was:

Salaries and Payments in the Nature of Salary

A2. Payments for Leave on Retirement, Resignation, etc.

Other Services

E. Payment of Court Costs awarded against Department

\$
60,000

1,000
61,000

Table A.7 Summarised Receipts and Payments Statement for the year ended 30 June 1986 in respect of Miscellaneous Special Deposits Accounts

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000	Actual \$000	Estimate \$000
TREASURY ACCOUNT 642												
EMPLOYMENT SCHEMES												
Receipts												
Grants	—	—	—	9,186	0	9,604	0	0	0	9,186	0	9,604
Total	—	—	—	9,186	0	9,604	0	0	0	9,186	0	9,604
Payments												
Salaries and other employee payments	—	—	—	6,044	0	4,710	0	0	0	6,044	0	4,710
Maintenance and working expenses	—	—	—	2,716	0	2,561	0	0	0	2,716	0	2,561
Total	—	—	—	8,760	0	7,271	0	0	0	8,760	0	7,271
INDUSTRY GRANTS												
Receipts												
Grants	—	—	—	4,292	0	4,405	0	0	0	4,292	0	4,405
Miscellaneous	—	—	—	149	0	76	0	0	0	149	0	76
Sale of Assets	—	—	—	28	0	157	0	0	0	28	0	157
Total	—	—	—	4,469	0	4,638	0	0	0	4,469	0	4,638
Payments												
Salaries and other employee payments	—	—	—	2,005	0	2,214	0	0	0	2,005	0	2,214
Maintenance and working expenses	—	—	—	1,146	0	1,361	0	0	0	1,146	0	1,361
Plant and equipment	—	—	—	684	0	616	0	0	0	684	0	616
Grants and subsidies	—	—	—	142	0	381	0	0	0	142	0	381
Other services	—	—	—	78	0	147	0	0	0	78	0	147
Total	—	—	—	4,055	0	4,719	0	0	0	4,055	0	4,719
WORKING ACCOUNT												
Receipts												
Collections	—	—	—	123	0	96	0	0	0	123	0	96
Grants	—	—	—	11,969	0	8,993	0	0	0	11,969	0	8,993
Miscellaneous	—	—	—	99	0	5	0	0	0	99	0	5
Total	—	—	—	12,191	0	9,094	0	0	0	12,191	0	9,094
Payments												
Salaries and other employee payments	—	—	—	9,866	0	6,939	0	0	0	9,866	0	6,939
Maintenance and working expenses	—	—	—	4,278	0	2,132	0	0	0	4,278	0	2,132
Plant and equipment	—	—	—	87	0	0	0	0	0	87	0	0
Grants and subsidies	—	—	—	0	0	58	0	0	0	0	0	58
Other services	—	—	—	0	0	183	0	0	0	0	0	183
Total	—	—	—	14,231	0	9,312	0	0	0	14,231	0	9,312
AUSTRALIAN EXTENSION SERVICES												
GRANT												
TREASURY ACCOUNT 861												
Receipts												
Sale of Assets	—	—	—	75	0	44	0	0	0	75	0	44
Payments												
Maintenance and working expenses	—	—	—	23	0	94	0	0	0	23	0	94
TREASURY FIRE RISK ACCOUNT												
TREASURY ACCOUNT 1449												
Receipts												
	—	—	—	0	0	0	0	0	0	0	0	0
Payments												
Maintenance and working expenses	—	—	—	3	0	66	0	0	0	3	0	66
UNCLAIMED MONEYS ACCOUNT												
TREASURY ACCOUNT 1951												
Receipts												
Miscellaneous	—	—	—	21	0	7	0	0	0	21	0	7
Payments												
Maintenance and working expenses	—	—	—	18	0	6	0	0	0	18	0	6
TOTAL SPECIAL DEPOSITS												
ACCOUNTS RECEIPTS	—	—	—	25,942	0	23,387	0	0	0	25,942	0	23,387
TOTAL SPECIAL DEPOSITS												
ACCOUNTS PAYMENTS	—	—	—	27,090	0	21,468	0	0	0	27,090	0	21,468

Table A.8 Summarised Receipts and Payments Statement for the year ended 30 June 1986 in respect of Miscellaneous Receipts Accounts

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000
Fees												
Witness and Jurors	3	0	4	—	—	—	0	0	0	3	0	4
Collection of Premiums	28	29	29	—	—	—	0	0	0	28	29	29
Miscellaneous Receipts												
Fines and Forfeitures	16	25	1	—	—	—	0	0	0	16	25	1
Interest	2	2	2	—	—	—	0	0	0	2	2	2
Repayments to Credit of Vote, Previous Years	100	250	94	—	—	—	0	0	0	100	250	94
Employer's Superannuation Contributions	716	829	764	—	—	—	0	0	0	716	829	764
Apprenticeship Training Scheme	32	0	38	—	—	—	0	0	0	32	0	38
Unclassified Receipts	82	94	51	—	—	—	0	0	0	82	94	51
On-Costs for Officers on Loan	201	0	252	—	—	—	0	0	0	201	0	252
Miscellaneous Receipts for Services Rendered	232	349	318	—	—	—	0	0	0	232	349	318
Total	1,412	1,578	1,553	—	—	—	0	0	0	1,412	1,578	1,535

Consolidated Fund Receipts Estimates are not Audited by Auditor-General.

Table A.9 Summarised Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Consolidated Fund—Capital Account

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000
Receipts												
Miscellaneous Receipts	0	0	0	—	—	—	—	—	—	0	0	0
Payments												
Capital Works and Services	3,779	6,000	5,365	—	—	—	—	—	—	3,779	6,000	5,365

Table A.9.2 Receipts and Payments Statement for the year ended 30 June 1986 in respect of the Capital Works Appropriation

Details	Consolidated Fund Recurrent Funds			Special Deposits Accounts Funds			Balance of Salaries			Total		
	1984/85		1985/86		1984/85		1985/86		1984/85		1985/86	
	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000	Actual \$000	Estimate \$000	Actual \$000
CONSOLIDATED FUND												
Payments												
Yanco Agricultural Institute												
Stage 1—Short Course Centre	1,416	70	(5)	—	—	—	0	0	0	1,416	70	(5)
Stage 2—Advisory Complex	50	305	264	—	—	—	0	0	0	50	305	264
Gaden Trout Hatchery—Jindabyne												
Water Supply	137	37	46	—	—	—	0	0	0	137	37	46
Tourist Facilities	68	164	207	—	—	—	0	0	0	68	164	207
Dutton Trout Hatchery—Ebor												
Tourist Facilities	1	392	389	—	—	—	0	0	0	1	392	389
Office/Laboratory Extensions—Gosford	223	964	979	—	—	—	0	0	0	223	964	979
John Macarthur Institute—Camden Park	281	650	277	—	—	—	0	0	0	281	650	277
Oyster Hatchery—Port Stephens	1	350	187	—	—	—	0	0	0	1	350	187
Biological & Chemical Research Institute												
Reroofing Blocks A, B and C	292	370	324	—	—	—	0	0	0	292	370	324
Fire Hazard Prevention	0	330	518	—	—	—	0	0	0	0	330	518
Agricultural Research Centre—Tamworth												
Extensions	9	168	155	—	—	—	0	0	0	9	168	155
Advisory Office Accommodation	0	60	89	—	—	—	0	0	0	0	60	89
Fisheries Office—Lake Illawarra												
Office and Boatshed	42	0	0	—	—	—	0	0	0	42	0	0
Advisory Officers & Prickly Pear												
Commission Accommodation—Mudgee	0	100	0	—	—	—	0	0	0	0	100	0
Replacement Cottage—Alstonville	0	86	65	—	—	—	0	0	0	0	86	65
Boatshed and Facilities—Narooma	0	55	1	—	—	—	0	0	0	0	55	1
Office and Boatshed—Merimbula	0	44	1	—	—	—	0	0	0	0	44	1
Incinerator—Armidale	0	55	68	—	—	—	0	0	0	0	55	68
Acquisition of Plant and Equipment, and Maintenance (Roads & Cottages)	1,259	1,800	1,800	—	—	—	0	0	0	1,259	1,800	1,800
Total	3,779	6,000	5,365	—	—	—	0	0	0	3,779	6,000	5,365

Table B Summarised Receipts and Payments Statement for the Consolidated Fund and the Special Deposits Accounts by item for the Year Ended 30 June 1986

Details	1984/85	1985/86	
	Actual \$000	Estimate \$000	Actual \$000
RECEIPTS			
Receipts For Services Rendered			
Rents and Students Fees	579	690	723
Fees			
General	916	900	961
Miscellaneous Services	2,016	2,401	2,308
Receipts—Fisheries and Oyster Farms Act	636	645	677
Commonwealth Contributions			
Plant Quarantine Services	2,780	2,855	3,011
Commerce (Trade Descriptions) Act	799	1,000	1,184
Overtime (Export and Import Branch)	320	312	330
CSIRO Cotton Research	59	60	60
Animal Quarantine Services	936	928	922
Animal Export Services	200	200	214
Commonwealth Fisheries	302	316	395
Grants			
Consolidated Fund	8,084	—	7,929
Commonwealth Grants	6,527	—	5,153
Employment Schemes	9,186	—	9,604
Industry Funds	4,292	—	4,405
Working Accounts	11,969	—	8,993
Special Statutes Appropriation	60	—	60
Special Supplementation	50	—	—
Sale of Farm Produce	1,229	1,290	1,143
Sale of Government Property	76	131	225
Sale of Publications	118	124	145
Repayment of Credit to Previous Years Vote	100	250	94
Employer's Superannuation Contributions	716	829	764
On-Costs for Officers on Loan	201	—	252
Apprenticeship Training Scheme	32	—	38
Miscellaneous Receipts	479	115	238
Fines and Forfeitures	25	30	6
Reimbursement of Administrative Costs	468	284	243
Reimbursement of Cost—Livestock Marketing Reporting Services	149	150	128
Levies (Noxious Insects Destruction Account)	1,093	—	1,304
Sale of Assets	738	—	899
Sale of Fisheries Licences	985	—	1,175
Prickly Pear Control Work	41	—	89
Interest	433	—	417
Stamp Duty (Cattle Compensation Fund)	134	—	164
Collections	123	—	96
Sub-Total	56,851	13,510	54,349
Balance of Salaries	528	—	718
TOTAL RECEIPTS	57,379	13,510	55,067
PAYMENTS			
Salaries and other employee payments			
Consolidated Fund			
Salaries, Wages and Allowances	62,206	64,349	64,667
Payments for Leave on Retirement, Resignation	1,928	1,876	2,757
Overtime	409	387	415
Sub-Total	64,543	66,612	67,839
Special Deposits Accounts	28,049	—	23,517
TOTAL SALARIES AND OTHER EMPLOYEES PAYMENTS	92,592	66,612	91,356

Details	1984/85	1985/86	
	Actual	Estimate	Actual
	\$000	\$000	\$000
Maintenance and Working Expenses			
Consolidated Fund Subsidiary Staff Charges			
Workers Compensation Insurance	1,353	1,421	1,374
Meal Allowances	15	15	16
Payroll Tax	418	379	397
Employer's Contribution to Superannuation Schemes	200	210	170
Expenses in Connection with Buildings			
Rent	476	504	500
Payments of Rates, Charges, etc.	257	329	278
Cleaning	102	107	53
Maintenance, Alterations, Additions and Renewals	1,552	1,897	1,262
Subsistence and Transport Expenses			
Travelling, Removal and Subsistence Expenses	3,492	3,341	3,447
Motor Vehicles—Running Costs, Maintenance, Hire and Insurance	1,758	1,909	2,083
Freight, Cartage and Packing	202	210	179
General Expenses			
Advertising and Publicity	71	75	82
Books, Periodicals and Papers	324	342	357
Postal and Telephone Expenses	2,423	2,544	2,636
Fees for Services Rendered	1,461	1,626	1,672
Stores, Provisions, Furniture, Equipment, Minor Plant, etc. (including Maintenance and Repairs)	5,942	5,927	6,025
Printing and Stationery	1,180	1,222	1,153
Gas and Electricity	1,841	1,898	1,818
Laundry Expenses	19	19	17
Other Insurances	—	1	—
Minor Expenses (not elsewhere included)	10	11	11
Sub-Total	23,096	23,987	23,530
Special Deposits Accounts	13,194	—	10,832
TOTAL MAINTENANCE AND WORKING EXPENSES	36,290	23,987	34,362
Plant and Equipment			
Consolidated Fund			
Purchase of Motor Vehicles	145	154	150
Other Plant and Equipment	68	78	78
Purchase of Marine Craft	79	84	80
Purchase of Equipment for Fisheries Inspectors	90	45	45
Sub-Total	382	361	353
Special Deposits Accounts	2,032	—	1,815
TOTAL PLANT AND EQUIPMENT	2,414	361	2,168
Grants and Subsidies			
Consolidated Fund			
Organisation of Agricultural Bureau and Branches	1	2	1
District Exhibits at Royal Agricultural Society Show	50	50	50
Australian Journal of Experimental Agriculture and Animal Husbandry	27	27	27
Agriculture Societies Council of New South Wales	1	1	1
C. B. Alexander Foundation	5	5	5
Rural Youth Organisation of NSW	15	10	10
Commonwealth Agricultural Bureaux	23	22	7
Destruction of Noxious Weeds	2,500	2,500	2,500
Tobacco Research	5	5	5
Pasture Protection Boards	27	6	10
Dingo Destruction Boards	46	43	43
Sub-Total	2,700	2,671	2,659
Special Deposits Accounts	1,529	—	1,096
TOTAL GRANTS AND SUBSIDIES	4,229	2,671	3,755

Details	1984/85	1985/86	
	Actual \$000	Estimate \$000	Actual \$000
Other Services			
Consolidated Fund			
Overseas Visits	31	35	135
NSW Institute of Rural Studies—Expenses	3	6	3
Livestock Market Reporting Service	128	145	106
'Tocal Homestead' Maintenance	25	25	25
Management of Australian Bibliography of Agriculture	16	17	16
Contribution Toward Expenses of Visiting Overseas Specialists	5	18	10
NSW Meat Industry Authority	465	250	250
Acquisition of Land for Relocation of Travelling Stock Reserves	—	—	40
Homebush Abattoir Corporation Review—Expenses	—	—	92
Expenses in Connection with Food Preserving Problems	75	83	83
Fruit Fly Suppression Program—Expenses	35	35	35
Plant Quarantine Publicity Campaign—States Share of Cost	36	37	36
Contribution towards Investigations into Commodity Treatment of Fresh Fruits	15	20	19
Contribution towards Repositories for Virus Tested Fruit Varieties	19	22	21
Eradication Campaign—The Green Snail (<i>Helix aperta</i>)	14	12	11
Noxious Plants Advisory Committee	19	25	25
Supplementation of Prickly-Pear Destruction Fund	1,320	1,317	1,317
Contribution to Water Hyacinth Control Campaign—Amount transferred to Special Deposits Account	5	8	—
Commerce (Trade Descriptions) Act—Expenses	1,215	1,344	1,392
Plant Quarantine—Expenses	2,792	2,925	2,936
Biological Control of Salvinia Weed	32	38	38
Agricultural Scientific Collections Trust	15	15	14
Repairs to Roads	60	63	63
State Grant (T.E.A.) Act—Expenses	72	75	107
Control of Legume Inoculant Quality in Australia—States Share	15	15	15
NSW—China Co-operative Agricultural Projects	15	35	188
Guayule Research Project	36	38	38
On-Farm Production of Liquid Fuel	41	—	—
Compensation to Beekeepers	33	25	24
Tuberculosis and Brucellosis Eradication Campaign—Amount to be transferred to Special Deposits Account	2,400	2,200	2,114
Eradication of Rabbits and Feral Pigs on Unoccupied Crown Lands	8	13	13
Chicken Meat Industry Committee—Expenses	12	19	19
Exotic Disease Feral Animal Control Study	—	20	20
Dairy Herd Improvement Centre—Expenses	677	679	647
Veterinary Surgeons' Board—Expenses	87	96	85
Animal Quarantine—Expenses	880	946	840
Animal Export—Expenses	195	214	209
Meat Inspection Service—Expenses	1,762	—	—
Commonwealth Advisory Body Contribution	24	—	—
Avian Influenza (Fowl Plague) Outbreak—Victoria, May 1985	—	—	482
Compensation (Cattle Tick Control)	2	6	—
Fencing and Other Facilities	17	150	150
Cattle Tick Research	54	54	54
Commercial Fisheries Exploration and Development Fund—Contribution	2,800	2,659	2,659
NSW Amateur Fishermens' Advisory Council—Expenses	7	11	8
Inland Fisheries Fund—Contribution	1,394	1,624	1,624
Meshing of Sharks	230	230	229
Purchase of Oyster Lease Signs	12	14	7
Tidal Angling Fund—Contribution	200	210	210
Payment of Court Costs awarded against the Department	—	—	1
Sub-Total	17,298	15,773	16,410
Special Deposits Account	1,244	—	774
TOTAL OTHER SERVICES	18,542	15,773	17,184
Balance of Salaries	334	—	528
TOTAL PAYMENTS	154,401	109,404	149,353
Capital Works and Services			
Expenditure on Capital Works and Services	3,779	6,000	5,365
TOTAL EXPENDITURE CAPITAL WORKS AND SERVICES	3,779	6,000	5,365

Table C Statement of Special Deposit Account Balances as at 30 June 1986

Previous Year			Accounts	1985/86		
Cash	Securities	Total		Cash	Securities	Total
\$000	\$000	\$000		\$000	\$000	\$000
			Sundry Deposits			
			Treasury Account No. 0642			
1,018	—	1,018	Industry Grants	939	—	939
1,694	—	1,694	Employment Schemes	4,027	—	4,027
2,037	—	2,037	Working Account	1,819	—	1,819
4,749	—	4,749	Total	6,785	—	6,785
			Tuberculosis and Brucellosis Eradication			
			Campaign Working Account			
78	—	78	Treasury Account No. 0643	198	—	198
			Australian Extension Services Grant			
171	—	171	Treasury Account No. 0861	121	—	121
			Special Drought Fodder Relief Scheme			
2	—	2	Treasury Account No. 0893	7	—	7
			Cattle Compensation Fund			
4,104	—	4,104	Treasury Account No. 1404	4,498	—	4,498
			Inland Fisheries Fund			
162	—	162	Treasury Account No. 1426	8	—	8
			Noxious Insects Destruction Account			
352	—	352	Treasury Account No. 1433	1,041	—	1,041
			Prickly Pear Destruction Working Account			
66	—	66	Treasury Account No. 1437	7	—	7
			Swine Compensation Fund			
(9)	1,550	1,541	Treasury Account No. 1446	(124)	1,550	1,426
			Commercial Fisheries Exploration and			
			Development Fund			
300	—	300	Treasury Account No. 1602	9	—	9
			Tidal Angling Fund			
27	—	27	Treasury Account No. 1669	5	—	5
			Tobacco Industry Trust			
15	—	15	Treasury Account No. 1670	8	—	8
			Water Hyacinth Control Campaign Working			
			Account			
50	—	50	Treasury Account No. 1698	21	—	21
			Wheat Industry Stabilisation Fund			
2	—	2	Treasury Account No. 1701	6	—	6
			Commonwealth Fisheries Act			
33	—	33	Treasury Account No. 1749	35	—	35
			Wheat Industry Stabilisation Investment Fund			
—	34	34	Treasury Account No. 2113	—	34	34
			Treasury Fire Risk Account			
(2)	—	(2)	Treasury Account No. 1449	(68)	—	(68)

Previous Year			Accounts	1985/86		
Cash \$000	Securities \$000	Total \$000		Cash \$000	Securities \$000	Total \$000
528	—	528	Balance of Salaries—Adjustment Treasury Account No. 1140	718	—	718
25	—	25	Unclaimed Moneys Account Treasury Account No. 1951	27	—	27
(88)	—	(88)	Motor Vehicle Advances Treasury Account No. 602	(29)	—	(29)
(35)	—	(35)	Advances to be Recovered—Salary Payments Treasury Account No. 1121	(3)	—	(3)
(8)	—	(8)	Advance to be Recovered—Bega Dairy Demonstration Farm Treasury Account No. 1108	(7)	—	(7)
(191)	—	(191)	Special Schemes to Promote Youth Employment and Employment Generally Treasury Account No. 1662	(191)	—	(191)
10,331	1,584	11,915	TOTAL SPECIAL DEPOSITS	13,072	1,584	14,656

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